Cement MILL SECTION of

Concrete

Vol. 23 AUGUST, 1923 No. 2

Security Cement Plant Enlarged and Improved

By Loring A. Cover, Jr.
Security Cement and Lime Co.

The Security Cement & Lime Co. has completed improvements and additions to its plant at Security, Md. which will increase its output of cement over 50%—increasing its capacity from 3,000 bbls. per day to 5,000 bbls. per day. Increased crushing capacity, a new stone storage of 12,000 tons capacity, a new system for transfer of crushed stone from quarry to mill by means of 50-ton standard gauge steel hopper cars and a locomotive with necessary loading and receiving facilities, increased drying, conveying and raw grinding facilities, five kilns enlarged by the addition of 10-ft. diameter burning zones in operation, and the addition of two tube mills, are the main features which have made this increase in output possible.

The plant and quarry are located at Security, Md. on the main line of the Western Maryland R. R. within the switching limits of Hagerstown, Md., where it can reach the Pennsylvania system through the Norfolk & Western R. R. and the Cumberland Valley R. R. The plant is directly served, also, by a branch line from the Baltimore & Ohio R. R., so that railroad facilities for the increased business are unexcelled.

The quarry is located about ¼ mile from the mill. A hard, high-calcium limestone is quarried from a quarry face a half mile long, varying in height from 20 ft. to 60 ft. No stripping is necessary. The quarry floor is level and equipped with standard gauge tracks. The preliminary crushing plant and new stone storage are built on the old quarry floor bordering Antietam Creek. Primary drilling is done by two Keystone steam well drills,[1] secondary drilling by tripod and Jack Hammer drills.[2] An increase in the number of the special type 10-ton side-dump quarry cars used was the only change in the regular quarry equipment necessary to handle the increased volume of stone. There, cars are loaded by two Marion steam shovels,[3] model "75" and model "60," of 4-yd. and 2½-yd. bucket capacity respectively, plus a small A-1 Thew traction shovel[4] of ¾-yd. bucket capacity as an auxiliary, and are placed at the crusher incline by a 26-ton 12-in. x 16-in. saddle tank Vulcan locomotive.[5] They are drawn up the incline by a 48-in. drum Flory hoist[6] and dumped sidewise by a Mundy hoist[7] into a 48-in x 60-in. "Blake" Allis-Chalmers jaw crusher[8] driven by a 200 H. P. motor. The crusher discharges directly onto a 42-in. belt conveyor inclined at 17° and 120 ft. long.

This belt formerly delivered into a small receiving hopper which fed by a rotary disc feeder into 3½-ton end-dump cars on narrow gauge track. The cars were drawn by mules to the plant. Provision was made to switch off clean stone to the ballast crusher situated between the quarry and plant. Clay could be added when necessary from clay pits located near the track to the mill. The stone was delivered from the cars by means of a cable and friction spool hoist to No. 8 Austin[9] and No. 7½ McCully gyratory crushers.[10] The empty cars returned by gravity to the quarry. The crushers discharged directly to a continuous bucket and belt elevator and the material distributed by a 24-in belt conveyor to three storage tanks of 927 tons combined capacity

Now the inclined belt from the 48-in. x 60-in. jaw crusher delivers directly to two 7½ McCully gyratories which in turn discharge into a belt and bucket elevator —50 ft. 9 in. long, 32 in. wide, 65° inclination, 46-ft. lift and 30-in. x 12-in. x 15-in continuous type buckets— which delivers the crushed stone to a 36-in. conveyor belt on the top of the new stone storage. This storage is 230 ft. long by 50 ft. wide and 35 ft. high with heavy concrete walls 12 ft. high at the sides and sloping up 45° on the ends to the conveyor belt runway above, and has a calculated capacity of 12,000 tons. It is covered by a steel building supporting No. 24 gauge corrugated iron roofing. The gyratory crusher building is of reinforced concrete columns and supports construction, covered with No. 24 corrugated iron. Uniform distribution over the entire stone storage is effected by a Robins 36-in. No. 3 high tripper[11] with No. 2 type chute which runs back and forth on the 36-in. belt conveyor on the top of the storage. The chief purpose of the new storage, aside from furnishing a reservoir for stone in bad weather, is to effect a uniform mix control. The stone is analyzed as it goes into the storage and the desired mix can be gotten by withdrawing stone as desired by means of 12-in. cradle feeders delivering to 24-in. conveyor belts in two

---

[1] Keystone Driller Co., Beaver Falls, Pa.

[2] Ingersoll-Rand Co., New York City.

[3] Marion Steam Shovel Co., Marion, O.

[4] Thew Shovel Co., Lorain, O.

[5] Vulcan Iron Works, Wilkes-Barre ,Pa.

[6] S. Flory Manufacturing Co., Bangor, Pa.

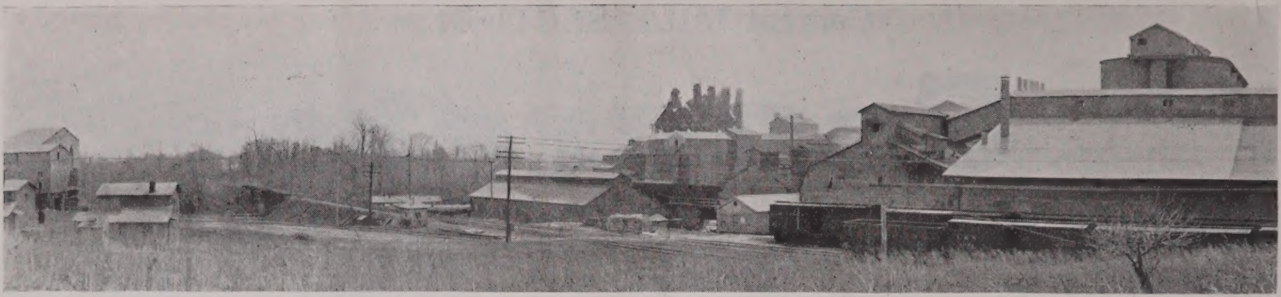
[7] J. S. Mundy Hoisting Engine Co., Newark, N. J.

[8] Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

[9] Austin Mfg. Co., Chicago.

[10] Worthington Pump & Machinery Co., New York City.

[11] Robbins Conveying Belt Co., New York City.

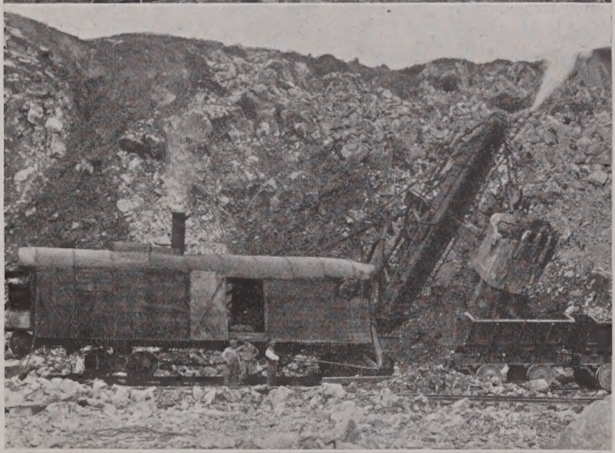


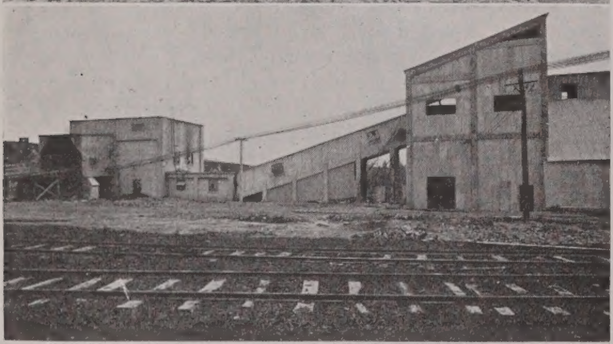
The Security Cement and Lime Plant—See Opposite Page Also

reinforced concrete tunnels underneath the storage. There are 24 of these cradle feeders to each tunnel, or 48 in all, thus giving every opportunity for thorough mixing. The two belt conveyors and an inclined cross belt connecting the two, carry the stone to a belt and bucket conveyor of type similar to the one at the other end of the storage. This delivers to a steel loading hopper of 100-ton capacity. A 50-ton standard gauge steel hopper car is loaded directly from the bottom of this hopper. A 26-ton Vulcan locomotive shoves it the 300 yds. up a slight grade from quarry to mill where it unloads into a 125-ton reinforced concrete receiving hopper provided with an 18-in. cradle feeder delivering to a belt and bucket elevator 36 in. wide and 85 ft. 4 in. long, inclination of 63°, lift of 76 ft. 6 in., and 34-in. x 9-in. x 13¼-in. continuous type buckets which in turn deliver by chutes into the three crushed stone tanks of 927-ton capacity mentioned above.

The elevator and conveyor equipment in all this new installation was furnished by the Robins Conveying Belt Co. The belting itself was furnished by the U. S. Rubber Co.

From the three storage tanks, the material goes by 12-in. cradle feeders and 22-in. belt conveyor to the SXP-8 Pennsylvania patented steel frame hammer crusher[12] which replaces the old W-7 Pennsylvania hammer mill. This reduces it to ½ in. or smaller in size. From there it goes by elevator to two 5-ft. 6-in. x 50-ft. Vulcan dryers[13] replacing the two old 5-ft. 0-in. x 50-ft. Reeves dryers[14], thence by elevator and chain





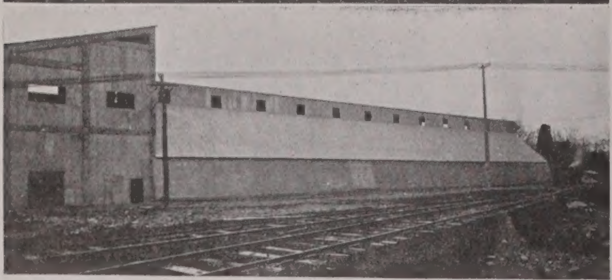


Fig. 1—View of Quarry Face Showing the Three Steam Shovels

Fig. 2—Model "75", 80-ton, 3½-cu. yd. Marion Steam Shovel

Fig. 3—Crusher Buildings—Jaw Crusher Building on Left with Incline and Gyratory Crusher Building on Right

Fig. 4—New Stone Storage. Capacity 12,000 Tons Crushed Stone

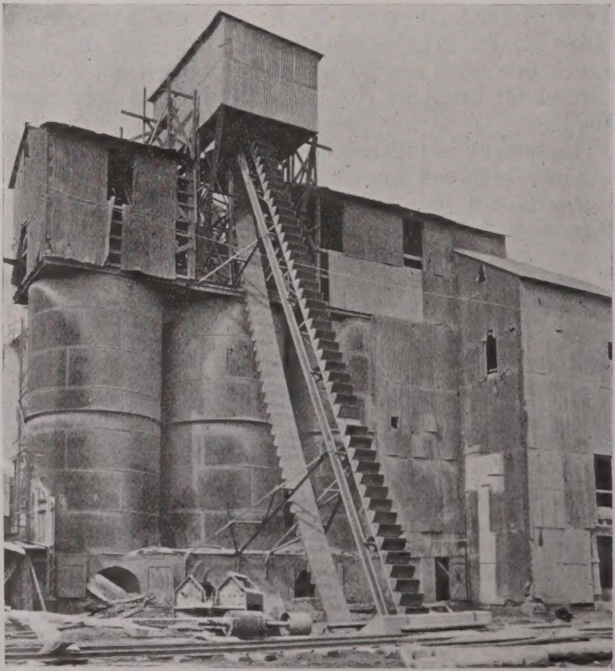


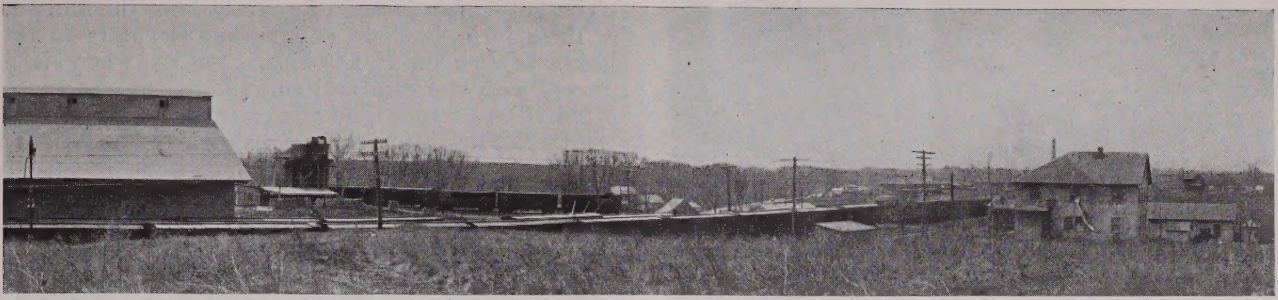
Fig. 5—Loading Elevator and Hopper at End of New Stone Storage. View Taken in Process of Construction

---

[12] Pennsylvania Crusher Co., Philadelphia.

[13] Vulcan Iron Works, Wilkes-Barre, Pa.

[14] Reeves Bros., Alliance, O.



drag to eight storage tanks of 1,300 tons capacity, then by two 18-in. belt conveyors and elevators to a poidometer where a small proportion of shale or cinders is added when necessary. No change has been made in the equipment for grinding, conveying and drying cinders. This consists of a Jeffrey type "B" hammer mill[15], chain drag and belt conveyor, and a 5-ft. 6-in. x 50-ft. Vulcan dryer. The proportioned mixture of stone and cinders goes by 22-in. inclined belt conveyor and chain drag to 8 steel and concrete raw mill feed tanks of double the capacity of the old tanks just replaced, i. e. 22½ tons each.

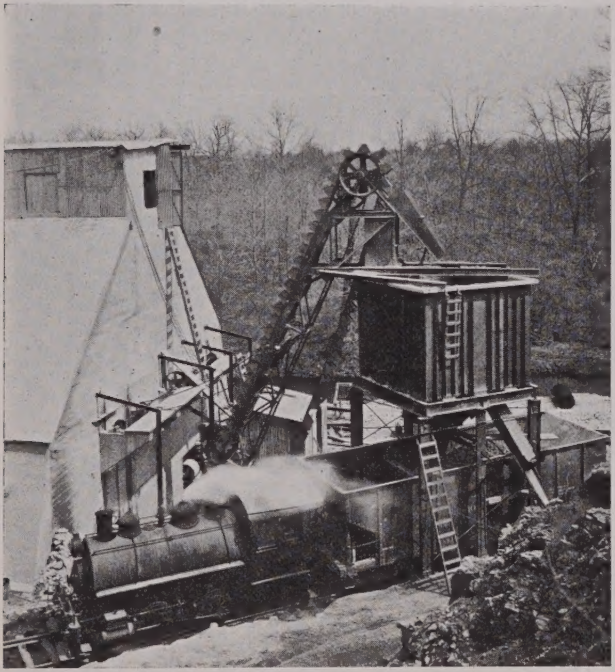
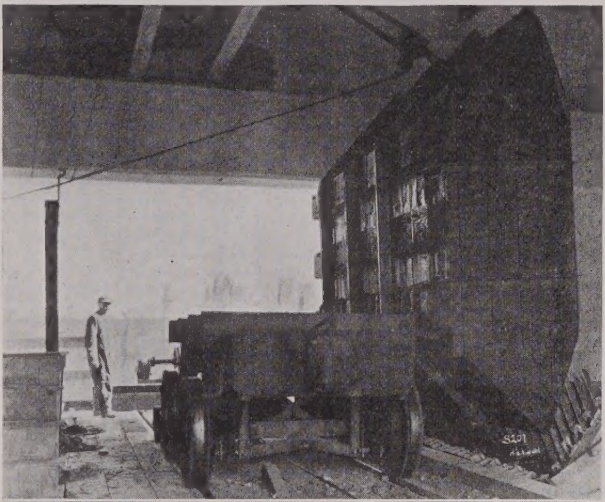
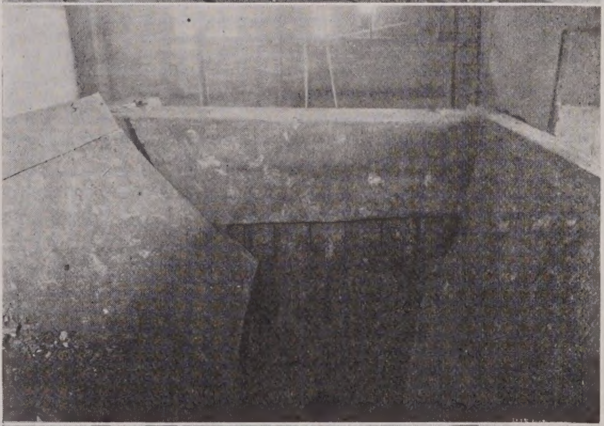


Fig. 9—Reinforced Concrete Receiving Hopper and Elevator Delivering to 3 Storage Tanks of 300 Tons Capacity Each. View Taken During Construction Work

In the raw mill, eight 33-in. Fuller-Lehigh mills have been replaced by 42-in. mills[16] and one additional 42-in. mill has been added, making, with the eight 42-in. mills already installed, a total of seventeen, 42-in. mills. Five of the new mills are driven by individual General Electric 75 H. P. vertical motors[17]. The eight old 42's are driven through line shafts by the two G. E. 300 H. P. synchronous motors installed two years ago. The other four mills are driven in pairs by two 150 H. P. General Electric motors. The raw mix on coming from the Fuller mills passes by screw conveyors and elevators to six raw mix storage tanks of 325 tons capacity each, where final adjustment of mix composition is made before passing to kiln bins.





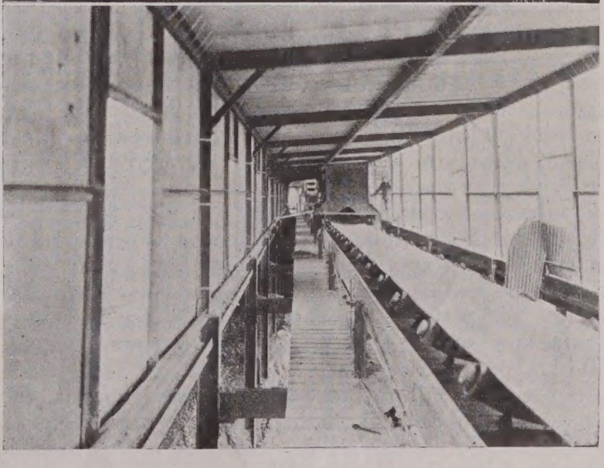


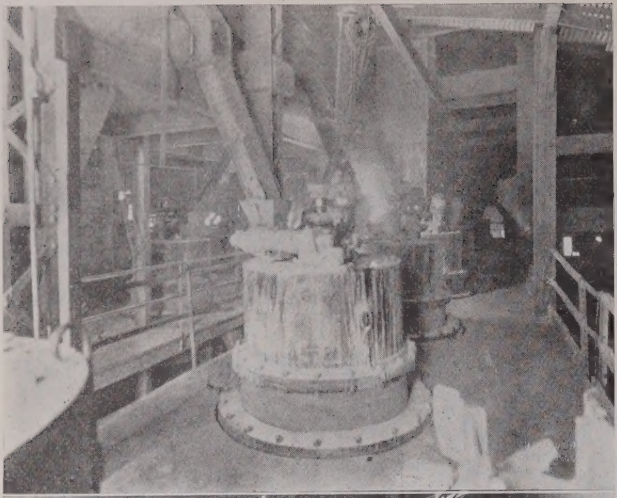
Fig. 6—Ten-ton Quarry Car Dumping into 48-in. x 60-in. Jaw Crusher

Fig. 7—Interior View Showing Opening of 48-in. x 60-in. Blake Allis-Chalmers Jaw Crusher

Fig. 8—View of Belt Conveyor and Robbins Tripper and Runway over New Stone Storage in Process of Construction

---

[15] Jeffrey Manufacturing Co., Columbus, O.
[16] Fuller-Lehigh Co., Fullerton, Pa.
[17] General Electric Co., Schenectady, N. Y.



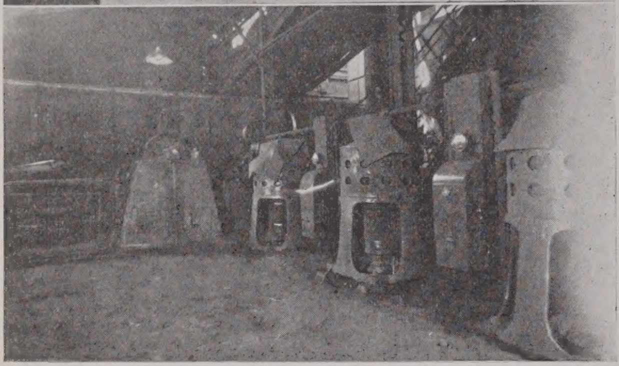


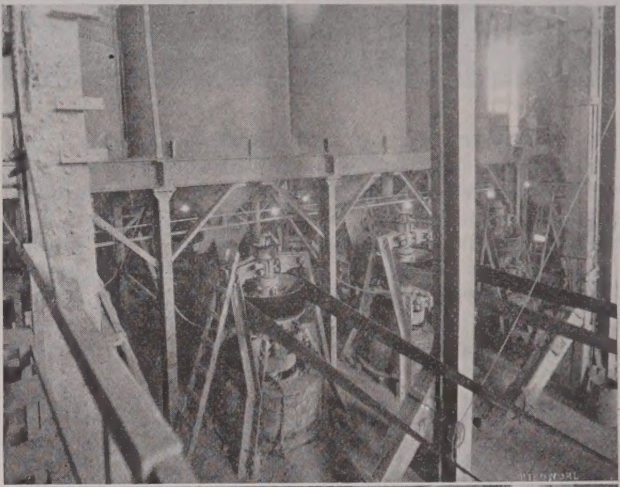
Fig. 10—View in Raw Grinding Mill Showing 9 New 42-in. Fuller-Leigh Mills Recently Installed

Fig. 11—View of New Vertical 75 H. P. Motors Driving 42-in. Fuller-Leigh Mills—Coal Mill

Formerly there were in operation three 8-ft. x 125-ft. and two 7-ft. x 100-ft. rotary kilns furnished by the Vulcan Iron Works but the three 8-ft. x 125-ft. kilns have been altered by cutting off 50 ft. from the front of the kiln and replacing it with a 40-ft. section 10 ft. in diamater and a taper section of 10 ft. to connect it with the 75 ft. of the old kiln remaining, thus giving a bottle shaped kiln 10 ft. and 8 ft. x 125-ft. The old 7 ft. x 100 ft. kilns have been torn out and replaced entirely by kilns 10 ft. and 8 ft. x 125 ft. exactly like the altered kilns. The new kiln sections, hoods, roller-bearings, and tires and the new kilns with accessories were furnished by Reeves Brothers. The new kiln sections to the altered kilns were lined with 9-in. fire brick, the 6-in. brick in the old part of the kiln remaining undisturbed. The new kilns were lined with 9-in. fire brick in the 10-ft. section and part of the taper section, but 2-in. sil-o-cel brick[18] covered with 4-in. fire brick was used in the 8-ft. section. The feed of the pulverized coal is regulated by a 6-in. feed screw of 2-in. pitch controlled by a Reeves variable speed transmission. Experiments are being made with 10-in. nozzles and will be made with preheated air in the near future. The performance of the new kilns has been very satisfactory so far with an average output of about 950 bbls. per day.

In the coal mill to meet the increased output, the four old 33-in. Fuller-Lehigh mills have been replaced by three 42-in. Fuller mills. The new mills are individually driven by General Electric 75 H. P. vertical motors with much economy of space over the old arrangement of 150 H. P. motor and countershaft. A new 48-in. x 36-ft. Cummer patent dryer[19] replaced the old one.

The hot clinker is carried directly from the kiln pits by three inclined chain and bucket elevators to the clinker storage of 55,000 bbls. capacity where it is sprayed with water to cool and allowed to season. A 10-ton Niles overhead electric crane[20] delivers it to an elevator, feeding into a hopper scale where it is weighed and gypsum added. It passes through Buchanan



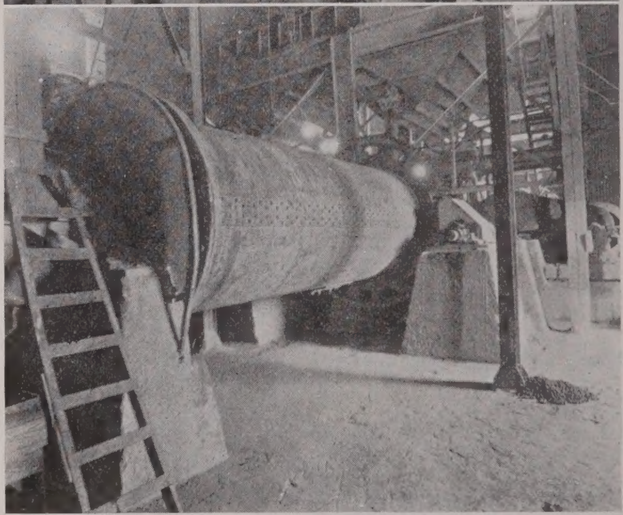


Fig. 12—Giant Griffin Mills for Preliminary Grinding—Finishing mill

Fig. 13—View of 6-ft. x 16-ft. Tube Mill Used for Final Grinding—Finishing Mill. Note Slugs in Foreground

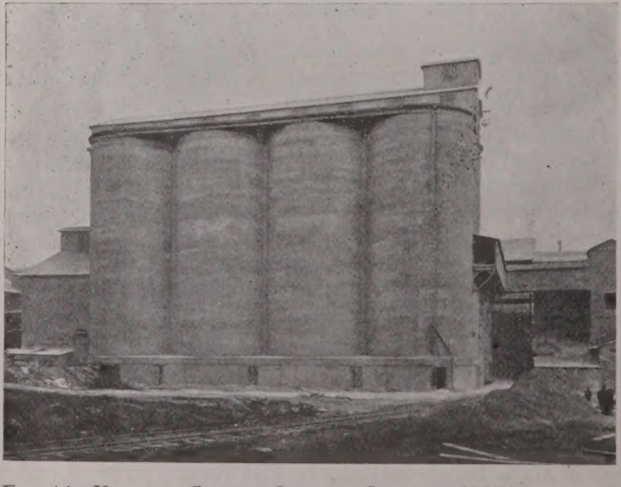


Fig. 14—View of Cement Storage Silos of 100,000 bbls. Capacity.

---

[18] Celite Products Co., New York City.

[19] F. D. Cummer & Son, Inc., Cleveland, O.

[20] Niles-Bement-Pond Co., New York City.

rolls[21], is elevated and conveyed by an 18-in. belt conveyor to four tanks of 210 bbl. capacity each, feedng 10 Giant Griffin mills[22] for preliminary grinding. No addition in equipment was necessary here for increased output. The finishing grinding is done by four 6-ft. x 16-ft. Krupp tube mills[23], two of which were added for the increased production necessary. Two General Electric 300 H. P. synchronous motors drive five of the Griffin mills and one tube mill. The other Griffins have 75 H. P. individual drives and the tube mills 250 H. P. individual drives.

The finished cement passes overhead in screw conveyors to the eight new concrete silos 70 ft. high by 30 ft. in diameter, built in 1921—capacity 100,000 bbls. —or to the old wooden stock bins on both sides of the two loading tracks at the packing house. These bins together with the silos give a total cement storage capacity of 200,000 bbls. Cement is withdrawn from the silos by spouts equipped with shut-off valves and delivering into 16-in. screws. Five Bates packers[24], four on one side of the two loading tracks and one on the other, receive the cement brought from the bins and deliver the bags directly into the cars. No change was necessary in the packing department to take care of the increased output except an increase in size of certain screw conveyors from 12-in. to 16-in.

Three new double houses for employees were also built as a part of the enlargement program.

A serious problem in connection with this enlargement was the maintenance of production during the process of construction, and the work was carefully planned to that end.

The new kilns were installed one at a time and without interfering with the operation of the others. A general shut-down of only 13 days sufficed at the end to tie in the new work.

The construction work was handled by the company direct. E. S. Guth, plant superintendent, acted as chief engineer and superintendent of construction. Engineering work was handled by the J. B. Ferguson Engineering Co. of Hagerstown under the supervision of Mr. Guth. The purchase of equipment was in charge of A. M. Tyree, secretary-treasurer and purchasing agent. F. B. Gilbert, asst. supt. took charge of plant operation during the construction period, and Loring A. Cover, Jr. had charge of the building of employees' houses. Other officials concerned in the planning and execution of this work are Loring A. Cover, preisdent, and John J. Porter, 1st vice-president and general manager.

Lime Kiln Thermal Efficiency

By Victor J. Azbe
Consulting Combustion Engineer, St. Louis, Mo.

Abstracted from Paper Read at the Fifth Annual Convention of the National Lime Association, June 13-15, 1923.

It is an honor to address this organization and the writer expresses the sincere hope that mutual beneficial results will be obtained. Many years have been spent by the one who presents this paper in the study of combustion as applying to industrial concerns and it was only about a year and a half ago that attention and study were given to combustion as it applies to lime burning, with the result that there is no question of doubt but what attention to this subject by the member companies of this organization will result, not only in saving in the fuel cost but increasing efficiency of their plants as well as improving their products.

There are few industries where so much fuel can be saved as the lime industry. On the other hand, also, there are few industries where it is so difficult to make this saving. The difficulty is mostly due to the fact that convenient methods for measuring kiln performance are not generally known; consequently, in very many cases the fuel efficiency check of any accuracy is not obtained until the end of the year. Even when a kiln test is run and all lime and coal weighed, the test has to be of so long a duration to mean anything, that all kinds of bad or possibly good conditions were bound to have crept in and so the final results could not possibly have portrayed the best possible conditions.

As a result of the above, many lime plants waste a tremendous amount of fuel. The fuel efficiency of many a kiln is only 20 to 25%, when an efficiency of 50% and more is possible with proper attention. A certain large lime plant was operated for an entire year at an average efficiency of only 24%. They saved some $25,000 a year by changing the firing methods, while if they would approach the 50% kiln efficiency mark the saving as compared with the 24% efficiency operating methods would be around $40,000 a year in fuel only.

Some lime kiln operators think they know when a kiln is right by appearances and while it is true that an expert kiln operator can tell a great deal, his senses are not delicate enough to be able to judge combustion and heat absorption efficiency of a kiln except only very roughly. The more the writer has to do with lime kilns, the less inclined he is to guess and the more he depends upon proper instruments as an aid.

As it was stated before, when a kiln test is being run, it necessarily must be run for at least one week during which time so many conditions may creep in that the final results tell only very little as to how the kiln should be operated for best results. To overcome this, the writer developed a method which is very interesting and should prove of value to engineers and chemists in the lime manufacturing plants.

When coal burns under a boiler, the carbon combines with the oxygen of the air to form carbon dioxide. The same happens in a lime kiln, only there, carbon dioxide is also being driven from the limestone by the heat from the fuel so there are two streams of carbon dioxide, one from the coal and one from the rock. In boiler practice, the carbon dioxide percentage in the waste flue gas is being determined in all modern plants because it indicates the amount of air used for combustion and is quite an important check on waste. Many boiler plants have automatic CO_2 recorders that take samples every few minutes, analyze it and record the results on a chart.

To know the carbon dioxide percentage that is escaping with the waste gas from the lime kiln is even more important. Due to the definite relation between the two mixed streams of carbon dioxide much more

---

[21] C. G. Buchanan Co., New York City.

[22] Bradley Pulverizer Co., Boston, Mass.

[23] Thomas Prosser & Son, New York City.

[24] Bates Valve Bag Co., Chicago.

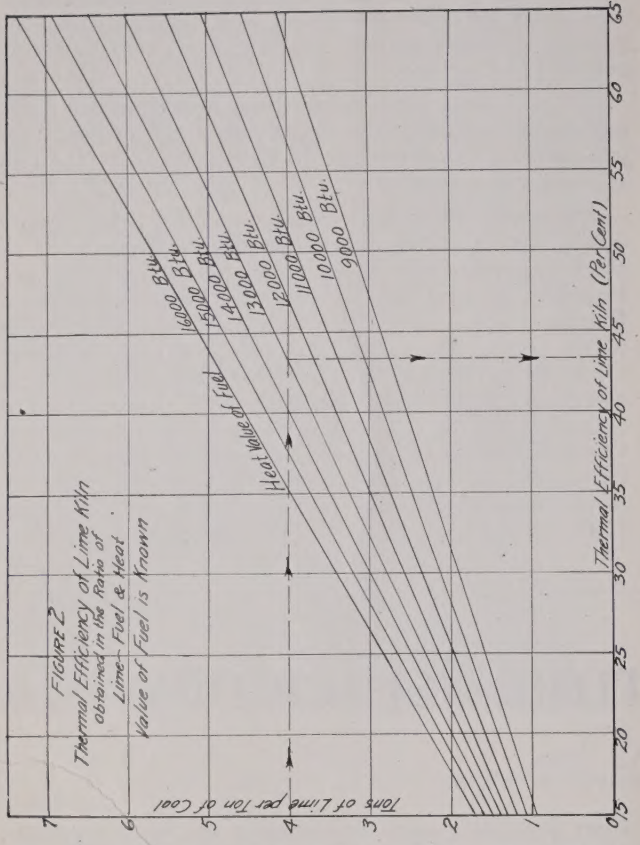


FIGURE 2
Thermal Efficiency of Lime Kiln obtained in the Ratio of Lime—Fuel & Heat Value of Fuel is Known

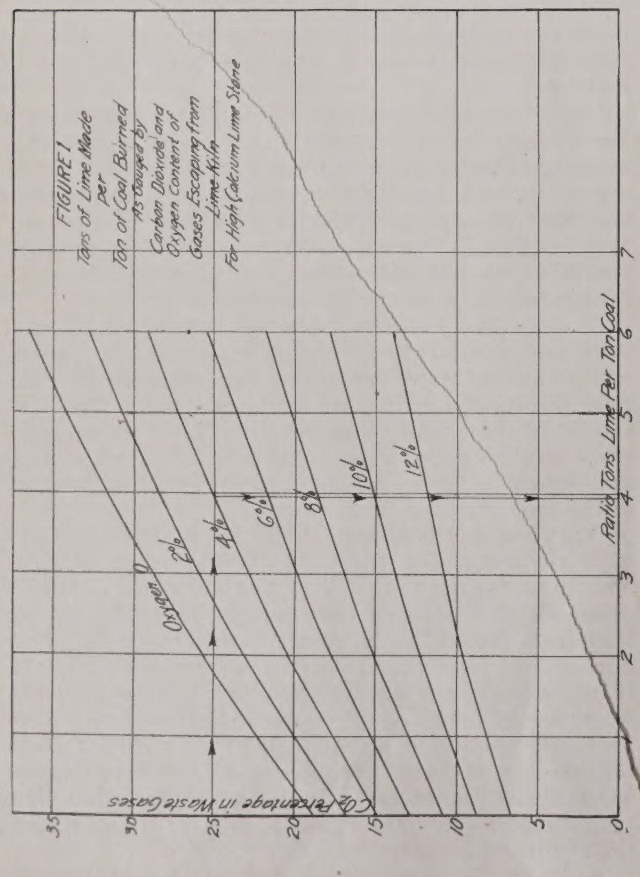


FIGURE 1
Tons of Lime Made per Ton of Coal Burned As Gauged by Carbon Dioxide and Oxygen Content of Gases Escaping from Lime Kiln
For High Calcium Lime Stone

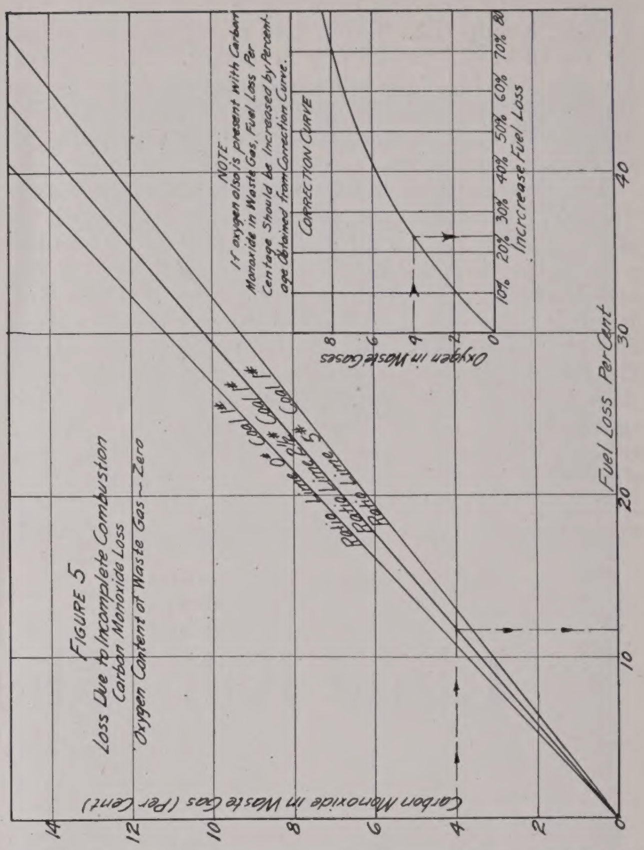


FIGURE 5
Loss Due to Incomplete Combustion
Carbon Monoxide Loss
Oxygen Content of Waste Gas ~ Zero

NOTE
If oxygen also is present with Carbon Monoxide in Waste Gas, Fuel Loss Percentage Should be Increased by Percentage Obtained from Correction Curve.

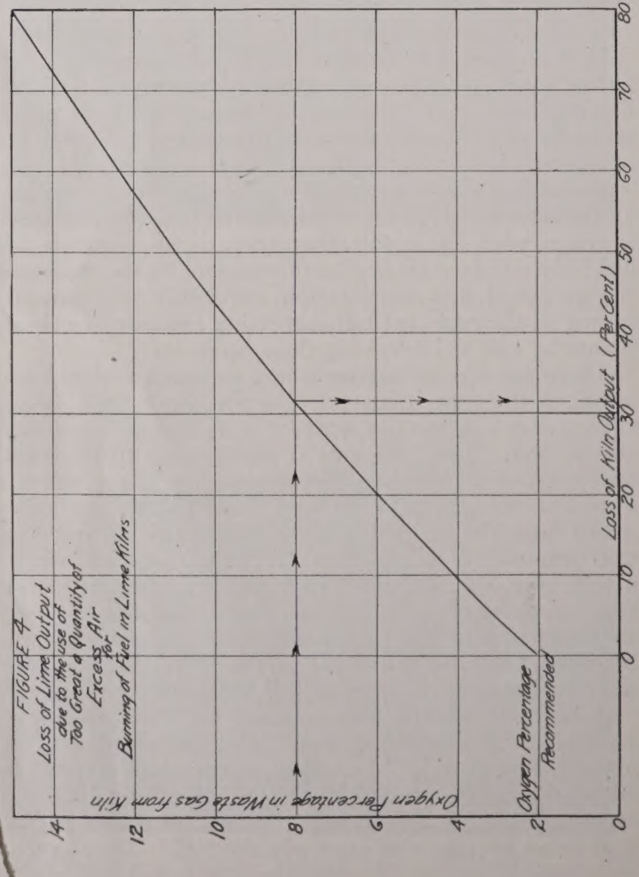


FIGURE 4
Loss of Lime Output due to the use of Too Great a Quantity of Excess Air for Burning of Fuel in Lime Kilns

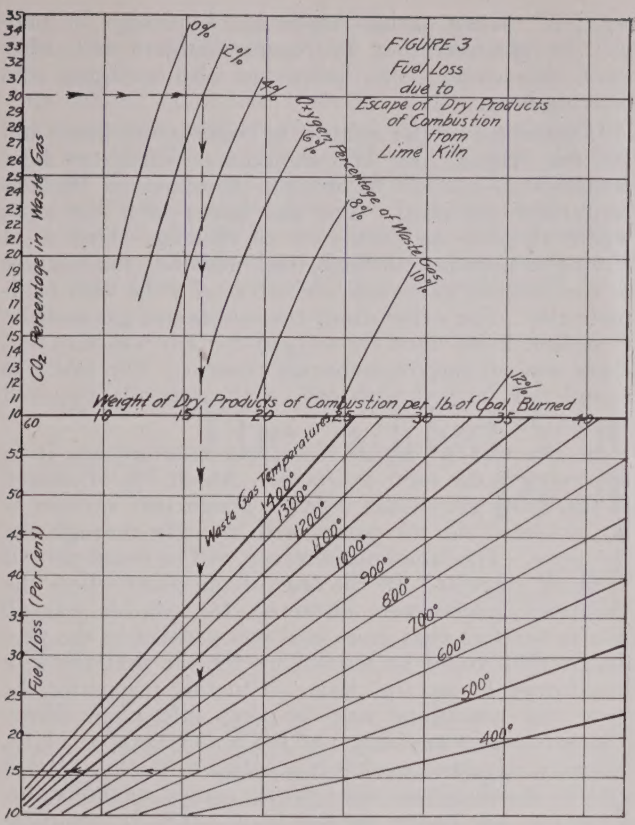


FIGURE 3
Fuel Loss due to Escape of Dry Products of Combustion from Lime Kiln

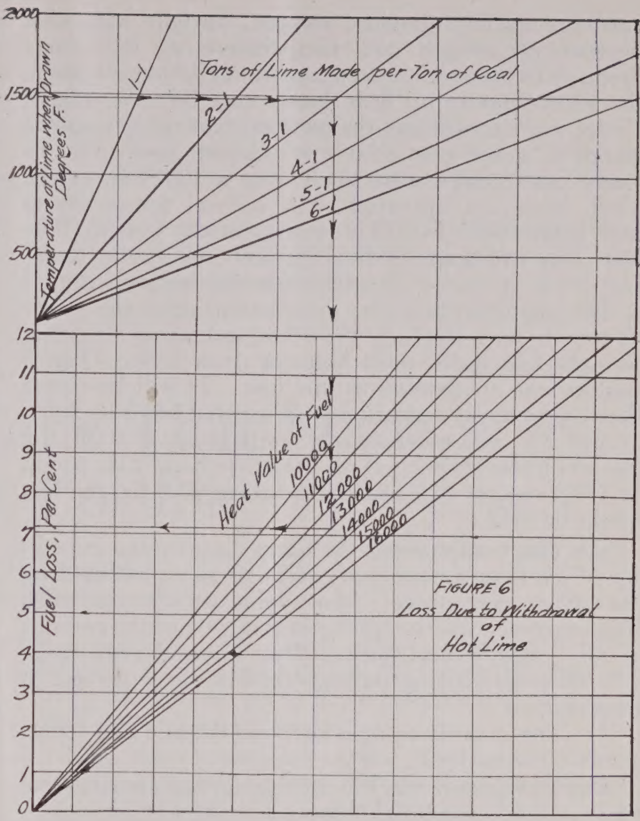


FIGURE 6
Loss Due to Withdrawal of Hot Lime

valuable information will be obtained than is the case in boiler practice.

With bituminous coal of the better grade, when burned under a boiler, the maximum possible percentage of carbon dioxide to be obtained would be about 19%. This is without the use of excess air; ordinarily, even under the best conditions, there will be at least 4% oxygen in the flue gas which is being brought in by the excess air used in burning the fuel which reduces the CO_2 percentage to 15%.

Assuming now that we are burning this fuel under a lime kiln we would get only 15% CO_2 and 4% oxygen the same as we did when burning under the boiler. If this would occur it would be quite evident that carbon dioxide is coming only from the coal, none could be coming from the rock and no lime would be made and consequently the ratio of lime to coal would be 0–1. If the CO_2 percentage would, however, be 20%, and oxygen still about 4, then we immediately would realize that to obtain such a large amount of CO_2 gas from coal, when so much excess air represented by oxygen is used, is utterly impossible and so the additional carbon dioxide must be coming from the limestone.

Fig. 1 was calculated on this principle. It will be noted that at 20%, CO_2 and 4% oxygen, the ratio of lime to coal is about 2–1. If the chart is further studied, it will be noted that for the same oxygen percentage, the ratio of lime to coal increases as the CO_2 percentage increases, and when the CO_2 reduces, less lime is made per ton of coal. Consequently, the more carbon dioxide gas there is in the waste gas from the kiln, the better it is. As it was noted, the carbon dioxide is modified by the oxygen. Since oxygen represents excess air and, naturally, the more excess air entering the kiln through holes in the fire on the grate or through the doors or brick work, the greater will be the volume of gas escaping, and the more will the carbon dioxide be diluted.

To use the chart it is necessary to have some kind of "Orsat" gas analyzing apparatus. Then a sample should be drawn from top of kiln and main gas stream, taking great care that a true sample is obtained. The sample should be analyzed for carbon dioxide, oxygen and carbon monoxide. After the first sample, several more should be taken, preferably every ten minutes for two hours. Then results should be averaged and by referring to Fig. 1, the ratio of lime to coal, can be obtained for that particular kiln and for that particular period. Following, are given several gas analyses representing poor and good conditions:

POOR CONDITIONS

CO_2	20	23	21.5	16.8	9.2	21.8
0	4.2	3.5	4.5	8.0	12	3.2
Ratio	2–1	2.7–1	3–1	3.2–1	2–1	2.3–1

GOOD CONDITIONS

CO_2	30	28.6	31.4	29.5	28.6	29
0	1.8	1.2	1.6	2.5	2.3	2.6
Ratio	4.5–1	35–1	48–1	5–1	4.3–1	4.9–1

It will be noted that CO_2 itself, while important, requires to be supplemented by oxygen analysis. It may be also well to emphasize carefulness. If analysis looks unreasonable, try to change the position of the sampling pipe since it is extremely important that a proper true average sample be obtained. At times, also, all-of-a-sudden results will be obtained which will look far from right. Quite often this happens but all that may have occurred is that the fireman checked his fire, shut off the air to the grates and the carbon dioxide percentage instead of dropping down, shot away up, all due to the fact that accumulated heat in the limestone continued to drive CO_2 from rock.

After the lime-coal ratio is determined, if the heat value of the fuel burned is also known, the thermal efficiency of the kiln may be obtained by referring to Fig. II. For example, assuming that the ratio is 4 to 1 and heat value of fuel 13,000 B. T. U. per pound then by drawing lines through the respective points as shown, the thermal efficiency of 43.25% is obtained. This figure means that 43.25% of all heat in coal was actually used to drive carbon dioxide from limestone while the balance of 56.75% was used or wasted in one or another of many different ways.

If the carbon dioxide, oxygen, carbon monoxide content percentage and temperature of the waste products of combustion escaping from kiln top is known, the most important heat losses can be determined. Under most conditions the greatest loss is that due to escape of gases at a relatively high temperature. In many cases temperature well over a 1000° F. exists, while kilns are operated with normal temperatures well below 500° F. This loss is usually called "The Loss Due to Escape of Dry Products of Combustion," and while it varies directly with the temperature, it is also dependent to a very great extent upon the excess air used to burn the fuel, the other, in-leaking air either through kiln walls, poke holes or draw holes. Fig. 3 enables one to determine this loss. It will be noted that under good conditions represented by CO_2, 30%, oxygen 2%, and escaping gas temperature of 600F, the loss would be 15.5%. If on the other hand CO_2 would be 19%, oxygen 8% and temperature 900° F., the loss would be 37%.

This chart emphasizes the harm done by the in-leakage of too large amounts of excess air as represented by the oxygen percentage. Many kilns are operated with 10% of oxygen which represents about twice the amount of air actually necessary. This unnecessarily large volume of air passing through the kiln does damage in three ways:

(1) It necessarily escapes hot from the kiln and consequently wastes heat.

(2) It overloads the kiln gas carrying capacity uselessly and consequently reduces kiln capacity.

(3) It reduces temperature in the kiln due to which the heat transfer between hot flame and the lime is reduced and kiln capacity lowest.

The second condition is illustrated by Fig. 4. It will be noted that the greater the oxygen percentage, the lower the kiln capacity. The principle assumed in drawing this chart is that if the air which uselessly passes through the kiln would be employed to burn fuel, more fuel would be burned and more lime made.

As to the third condition, it may be said that it is possible to use so much excess air that the dilution would be so great that temperature would be below the temperature required to decompose limestone and so no lime would be made no matter how much fuel would be burned.

Some excess air however, is necessary, otherwise incomplete combustion, a second most important loss of heat from lime kilns, will result. This loss in some cases is so great that the gas burns to a height of ten or more feet above the shaft kiln and at night illuminates the surroundings. Of course only gross carelessness will permit such condition but even in plants where this does not occur the loss due to incomplete combustion at times is from 30 to 40%.

The presence of carbon monoxide, a combustible gas resulting from gasification of carbon in the waste gases leaving the kiln, indicates a loss due to incomplete combustion. In a certain lime burning plant the following results of gas analysis were obtained:

Time	Carbon Dioxide	Oxygen	Carbon Monoxide	Smoke
10:25	29.4%	0	12	Heavy
10:42	28.4	1	1.2	Slight
10:47	24.0	0	0	None
11:00	24.2	4.5	0	None
11:15	32.0	0	12	Heavy
11:30	28.7	0	2.4	Light

Fig. 5 illustrates the seriousness of having as high as 12% carbon monoxide in the waste gas; when this occurred the loss of fuel was about 37%, all of which was preventable. Even when carbon monoxide percentage is only 4%, the loss still is 11%. The loss calculated from presence of carbon monoxide percentage is, however, not the entire loss due to incomplete combustion. When carbon monoxide is present, it may well be assumed that hydrogen, methane and other very rich combustible gases are also escaping and wasting heat.

If there is a proper mixture of combustible gases and air, the vertical lime kiln should not waste any heat whatsoever, due to incomplete combustion because conditions are ideal. The gas burns in a hot zone where there is no possibility of chilling. Due to it having to percolate through the limestone, the mixture of combustible gases and air is bound to be very complete also. The writer many times obtained gas samples from lime kilns when the oxygen content was zero and there was no carbon monoxide present. The fuel was completely burned with only a theoretically required amount of air.

In practice to assure complete combustion, it is necessary to use some excess air. About 2% of oxygen in the waste gas should indicate a sufficient amount of air, provided this air passes with the gas through the hot zone. This amount, however, will be insufficient if firing is irregular. In the case of the plant where the tabulated results were obtained, the trouble was all due to the fact that more coal was gasified in the producer, than could be burned by the air that the kiln could draw by natural draft. A further reason for the very bad conditions was the very infrequent firing. The producer was charged at 10:25 and again at 11:15, consequently, the gas that it supplied to the kiln varied greatly in volume and since the air supply was constant, there was just barely enough air at times for complete combustion and at other times, a great deficiency.

Regular and frequent firing is extremely important in case of lime kilns. When there is heavy smoke, there is great waste due to incomplete combustion. When there is no smoke whatsoever, there is liable to be a great waste also, due to the too large volumes of excess air.

There are other heat losses encountered in kiln operation but they cannot be controlled as readily as the loss due to too little air or the one due to too much air, or too high temperature of escaping gases; they are:

(1) Radiation which can be controlled only by varying the kiln design.

(2) Loss due to moisture in air, which is very small.

(3) Loss due to moisture in rock, which loss is also very small.

(4) Loss due to escape of moisture resulting from combustion of hydrogen in fuel. This loss can be reduced slightly if temperature of escaping gases is reduced, and, also, if efficiency is generally improved, so that less coal is burned for a given amount of lime made.

(5) Loss due to withdrawing of hot lime. The magnitude of this loss can be determined from Fig. 6. This loss can be reduced somewhat when operator is very careful.

(6) Loss due to carbon in ash. This loss depends upon ash percentage in coal and care used in cleaning fires.

It is the writer's opinion that possibilities for improvement in combustion and heat absorption efficiency in the lime industry are tremendous and were barely touched. While there were several exceedingly good papers written and delivered before the National Lime Association, the number of investigations made on lime kilns is small as compared with investigations made on boilers. As a result, it is nothing unusual to find a boiler 70 and even 80% efficient, while the majority of lime kilns are operated only around 30% efficient. Of course, to equalize lime kiln and up-to-date boiler performances, would require a special lime kiln construction; nevertheless, the difference, even in the case of ordinary kilns, should not be great. The lime kiln is at a disadvantage due to greater wall area for the amount of fuel burned, consequently, the radiation loss will be more than that for a boiler. Also, lime withdrawn is usually at a red heat. But radiation can be controlled by insulation, and to offset the heat lost by the hot lime, the lime kiln has the advantage by the counter current heat flow in upper zones of the kiln and also by the much more thorough mixtures of air and combustible gas in the burning zone. One may say that a good kiln and a good boiler, both properly operated, should give equal results; also, a poor kiln and a poor boiler should give equal results. Why this not the case is due to two reasons:

(1) In the lime industry little or no attention is paid to proper proportioning of air and fuel.

(2) Heat transfer in many cases is very poor due to ununiform size of rock charge or improperly charged rock.

I think I am safe in stating that nearly half of the fuel burned by lime manufacturers is wasted, which waste should be prevented.

The Added Volume That Made a Profit Possible

By John R. Morron

President, The Atlas Portland Cement Co.

Reprinted by special permission from *System*, the Magazine of Business.

Our special problem at the beginning of the period I am to tell about was to make the large volume of business that we were doing more consistently profitable. We were turning out and selling as much portland cement as we have in any, except one, of the 8 or 10 comfortably profitable years since—and making almost nothing on it.

How this came to be so is very largely the story of the radical change that had just come over the entire cement industry—the change from the long boom period, in which production rather than sales was the problem, into a period of overproduction and of genuine, painstaking business building on the part of any company that was to hold its own.

The broad outlines of our own story were these: We had, some years before, done a very substantial business in Pennsylvania, New York, and the rest of the eastern states, which was our proper territory with our largest mills situated as they were—in the East. Then some of our competitors enlarged their capacity, there was livlier competition, and business was harder to get in this territory.

At the same time the Central West—Ohio, Indiana, Illinois, and other states—was clamoring for cement. Selling was simply a matter of order taking out there. This company, after assuring itself reasonably of the permanence of the business from that quarter, went in for it extensively. It never stopped going after the eastern business, but the abundance of business readily available from the West kept it from really coming to grips with the situation in the East, from adopting methods that would hold and increase business there. The eastern business, at least in some important localities, actually declined. For the time being, the results were entirely satisfactory so far as both total sales and profits were concerned, and they might have gone on being so but for an unexpected development.

It had been assumed, while our company's western expansion had been going on, that portland cement, or at any rate enough of it to supply that part of the country, could not be produced in the West. A peculiar combination of limestone and shale or clay formations, in the place where the plant is to be, is necessary commonly for commercial production, and it was very generally believed that this combination existed in only a few places west of the Lehigh Valley in Pennsylvania. The heads of our company, therefore, believed that in going into that country they were going where there could be no considerable competition from mills closer at hand.

Then this competition came.

Within a few years, the right combination of materials was found in Ohio, Indiana, Michigan, Illinois, pretty nearly every one of the western states in which we were doing business. New plants sprang up in all these states, plants which not only were closer to the market, but which presently served to oversupply the market, so that we were confronted with the sharpest kind of competition in price as well as in quick shipments, and the like.

The situation was more trying than it would have been with almost any other product, for the reason that cement is heavy and the freight charges high on it. In order to go on selling at all, we had to absorb the difference between freight charges on the local companies' hauls and our own. The consequence was that we were soon selling cement in large areas of this western country at a net loss.

We had dropped a part of our eastern business because of stiff competition. Now, in the new territory, we had the same stiff competition and in addition this enormous freight handicap. And there was the large output of our mills to be cared for.

This was the situation at the beginning of this story about 10 years ago. We were still doing our large volume, but how to maintain it, or anything like it, and get in a reasonable profit on it—that was the question.

This may seem an unusual situation, but there has been something, less acute to be sure in most cases, but curiously like it, in every business that I have ever had the privilege of seeing into. And I have seen pretty closely into a number, in several different lines. One of the things against which the manager in every line needs to keep the closest watch, it seems to me, is this double tendency to move on to markets that are merely easy to sell, and to look upon volume, from whatever quarter, as a good thing in itself. Much of the trouble in business—more than we usually suspect—arises from that.

The obvious strategy for us in our crisis was to come at last to grips with the difficulties in the territory that was properly our own—that is to say, in the East, in the section of the West that could be profitably served by our one western mill (in Missouri), and in the part of the South where we were already planning to have a mill. We had to do something to give us our full share of the going business in these territories and at the same time, as far as possible, create new business, new uses of cement, in them. And we had also to clip off all the unprofitable fringes of our market outside these territories.

This last we did at once, and the rest we immediately set out to do.

Two of the commonest and best methods of going after the new business we required, I should explain, were closed to us by the nature of our product. We could offer no special inducement in the way of quality, because portland cement, for all practical selling purposes, is a thoroughly standardized commodity. You might make better cement—and some of us think we do—but the users, very largely contractors and other people experienced with the product, are not much impressed by it, for the simple reason that the Government standards which every manufacturer must meet to remain in business, or do any considerable business, are very high. The purchasers are not greatly interested in anything better.

And because portland cement is a standardized product, there was no possibility of a special appeal in the way of price. In the East as in the West, cement prices, because of heavy production, had just gone through a process of severe hammering down, so that our margin, even on the business we were doing comfortably near home, was about as small as we could stand. But even if that had not been so, even if we had been in a position to make price cuts, the other manufacturers, offering virtually the same product, would have had to meet the cut to hold their business. That is what they always do—inevitably. Exactly as the price of butter and eggs or any other standardized commodity gets down to the same level in the same community.

With the possibility of special appeal through price or quality cut off in this way, how did we go after our extra volume that would make profit possible?

We went after it with service. Since we could not try for a monopoly of any other sort—even if we had wanted to—we tried for a monopoly of service.

We never achieved the monopoly—naturally. But holding that up for a goal has been abundantly worth while to us.

To tell all about the "service" that we have developed under this policy would be to write a book. Not a little of it has proved to be quite worthless, because it proved to be not real service. A considerable variety of it has proved its merits beyond question, including especially our advertising and the research work carried on largely through our trade association. All this has repaid us over and over again. But the most vital part of the work, the part that has counted most, and without which the other could not have been nearly as useful, has been the development of better personal contacts all along the line between ourselves and the users of cement.

This began with our handling of dealers. Previously our contracts with them had been almost metallic—the sort of thing you get inevitably where selling has been easy. Our salesmen had called on them, of course, but there had been more buying during the calls than selling. Our salesmen had been content to be order takers, because that was all that they had to be or that the company expected of them. And when the order had been taken and the goods shipped, there was no very thorough effort to see either that the goods reached the dealer on time or that they moved readily from his warehouse. We were an extreme case, no doubt alodg with the cement industry, and yet not essentially different, I take it, from most businesses where there is extreme pressure of demand upon supply.

But we saw plainly that under the new conditions, any intelligent policy meant selling *for* the dealer as well as *to* him. And this meant, first of all, more salesmen and better control of these salesmen. Instead of 4 salesmen traveling out of Philadelphia, therefore, for example, we soon had 17—and instead of really traveling out of Philadelphia they were living in their territories, so that they might have more the point of view of the dealers and the dealers' customers and see better how they could be served. Also, instead of a single manager in New York, personally directing all our salesmen everywhere, we presently had 13 district sales managers, under a general sales manager in New York, so that the control would be more intimate on the one side and the sales management would have more time to think on the other.

The salesmen—as quickly as we could train them to do it—stopped passing up the places that were hard to sell. We began to see that these places might be, that indeed they were, of greater importance to us that any others, and we passed this view right along to the salesmen.

The results were gratifying. Take a certain small town not far from our plant in Pennsylvania, for example. We had never had a dealer there, and we had given up very seriously trying to get one. It had been regarded as too hard a problem to bother with. But under the new policy we were fortunate in having a man in that territory who specialized in that town because it was hard.

He set out to make such a demand for our product there that the opportunity of becoming our dealer in the town would be irresistible—and irresistible to the right sort of man. He spent some time in the town. He painstakingly got up a list of the people thereabouts, in the town and in the country, who seemed most likely to go in for concrete construction, and circularized them. He told them of specific uses of cement that seemed to be suited for them, and then on return postal cards, and the like, invited them to send for specific helps on concrete construction that we were beginning to get out by that time even for the smallest users. He soon had a great sheaf of inquiries and a number of actual orders. With these in his hand, the competition was all the other way. He had the choice of the available dealers. The town immediately became a good market for us, and it has been that ever since.

In some places the trouble was that we had a dealer, but he was the wrong sort. No practicable personal relations with him could bring us the right results. I recall one town like this. The man was ready enough to buy from us, but a poor hand at moving what he bought. His heart was not in the business, he was a misfit, and as keen to get out, we found when we looked into the facts, as we were to have him. The salesman in the territory again handled the case. He found a man in a neighboring town who was fitted for the job and wanted it, and the salesman arranged for the sale of the business to him. Our volume in that town was soon exceeding what we had previously thought it should be.

But that was an exceptional case. Mostly we have seen that we could get the best results with the dealers already on the ground, that their experience and acquaintance were too valuable to sacrifice. We have gotten some remarkable results by cooperating with these men.

Take the matter of storage, for instance. Cement is heavy and is spoiled if it gets wet. Therefore, conveniently situated, dry storage space is of the first importance to the dealer. It may be the determining factor in his profits and his interest in pushing cement. But often the dealer is a very busy man, with many other things than cement to handle, and neither time nor facilities for working out his cement storage problem in the very best possible way.

Obviously, he needed our help on that. And so we had our engineers design a model warehouse—and then go about, not just imposing the designs on the dealers, but adapting the principles of it to their individual needs as rapidly as the dealers were ready to undertake new construction or changes in buildings they already had.

Service That Brings Added Volume

This work has meant savings and more profits to the dealers, and it has turned many of them into better customers. It has made them like to handle cement, and therefore push the sale of it more in relation to the other materials that most of them handle.

We had our auditing department do the same sort of thing. One of the big problems with many dealers in this, as in other lines, is their bookkeeping. How can they do it simply enough and yet adequately? They cannot always be interested in the theory of accounting, they may not see the practical value in that—and perhaps there is none for them. But they are prepared to be tremendously grateful to anyone who will help them work out their individual accounting problem. Our auditing department has given a good deal of attention to that. Members of the department have frequently gone out and worked personally with the dealers.

The salesmen have been very necessary and at the same time very able cooperators in all this work. It has been their task, as a rule, to bring things to the point where the auditing department or the engineering department could render its service—to sell the service, in a word. And in many instances they have gone further and actually helped the dealer to arrange his warehouse or sat in for a day or two on his books in his busy season.

But how, someone may ask, do we train our salesmen for this? How do we get them to go in for it, along with all the other things they have to do?

We feel that we have a great deal yet to learn about this sort of work, and much of what we have accomplished has been due to the men we have had the good fortune to get, more than to the training. And yet in the training itself, we have made some evident progress. Sales conventions, and a constantly revised and improved sales manual embodying the best of our salesmen's experience, have helped. Also, seeing to it that no really good piece of work passes without special notice has certainly helped. Comments on such work gain in force, naturally, if they come from the head of the business, and for that reason and because it is one of the genuine rewards of being in business, I see to it that all exceptional work is reported directly to me. Of course, where a man is missing his opportunities, we do not let him fail to see that that also is being noticed.

But the most effective training of salesmen we have done has been training by example. In one state, our sales a little while ago failed to show what seemed to be a reasonable increase. There were some talks between the sales management and salesmen from the territory, and the salesmen's feeling was shown to be quite generally that there was no trouble except that—what happens sometimes in the best regulated families—we had lost a couple of good-sized contracts. That was of course a part of the trouble, but the headquarters force also gathered an impression that the sales force in the territory was perhaps a bit in a rut—a bit too ready to admit that it had gone as far as it could, considering the type of territory it had.

It is no sin to get into a rut—or if it is, it is one we are all guilty of at times—so that the case did not seem one of censure, even if we could satisfy ourselves that we were right about it. What we did was to send out a man to make a test, a man not familiar as the salesmen with the apparent limitations of the territory. He went with a sort of roving commission, to see first just where he could best take hold. Presently he hit on three dealers, well distributed over the territory, not exceptional dealers in any way, just good average ones, who were willing to try working out improvements in their methods. And with each of the three, our man worked out substantially what we have come to call our B. B. B.—build bigger business—plan.

He went with the dealer to the local newspaper and got the names of the newspaper's subscribers. Those evidently were the people in the community who read, and to this list the dealer was induced to send out a series of circulars on Atlas cement and its uses, which our man had very carefully helped him to prepare. In two instances, the dealers had thought this sort of circularizing was beyond them, was only good for bigger dealers and bigger towns—or at any rate other dealers and other towns. That was the bit of a rut they were in at the time. But they saw from this experience how practicable the scheme was. The newspaper owner was, of course, glad to cooperate with them, for as a by-product of the circularizing campaign, he got advertising, not only from our dealer, but dealers in other building materials

Our man also stayed about long enough in each case to help the dealer handle some individual sales that required perhaps more initiative than the dealer was used to exercising.

All the work had, of course, to be handled with the greatest tact and consideration. But in every instance the work went on harmoniously and large increases in sales resulted—large for those small communities.

But what really counted and repaid us for our pains was that the example spread. The salesmen throughout the territory were impressed. Here was old Bill Jones—or whatever his name was—a man they knew and the very type of dealer with whom they thought they had gone as far as they could, suddenly selling twice as much cement as he had sold before. They saw it done and they warmed up to this preaching by example, where preaching by words, through sales conventions or "ginger" letters or in any other way, would probably only have left them cold. As a result, the increase in sales in that territory the following year was one of the most satisfactory in our whole business.

These are some of the methods by which we have made the large volume that we were already doing, reasonably profitable to us—as it has been now for a good many years. They are selling methods, of course, but they represent the working out of that single idea of service, of stopping at nothing that was real service. For when you get down to the realities of selling and service, I suspect there is not much difference between them—and that there is no limitation on the one that is not a limitation of the other.

Cement Labels I Have Met—Part 7

By Charles W. Erdell
Bethlehem, Pa.

We herewith present the seventh group of miniature cement labels, and in the perusal of this article you will, therefore, in your mind's eye, spend most of your time looking up the cement plants of Belgium and Germany. It has not been possible to reproduce as many of the Belgian labels as was thought desirable, due to the fact that the colors on many of them do not have enough contrast. In the case of the labels of the German manufacturers, it was possible to reproduce nearly all of them, and this is the reason why so many labels of the latter country are being shown in this issue. These labels total one hundred and represent plants in foreign countries as follows:

Spain,	1
Denmark,	1
France	1
England	1
Belgium	13
Germany	83

This brings the grand total of trade-marks so far shown to the five hundred mark. There remain a possible one hundred of various countries yet to be shown, including some from the United States, and a few from Canada and Mexico.

The Final Installment

In the next issue (September) of Concrete will be reproduced, therefore, the "remnants" of the collection of these cement labels. It is hoped that the reader will look forward to that issue with unbated interest, as a number of new American labels will be shown and quite a few obsolete brands of American cements will also make their appearance. The remainder of the foreign labels to be shown will go far toward making the article of great interest to all.

Acquisitions from Readers

The writer has already received quite a number of labels from several readers of Concrete, both here and abroad, and the friendly spirit in which they were submitted goes to show that the readers of this publication are wide awake, and have that spirit of cooperation which Concrete desires to inculcate in its clientele. This spirit of cooperation is a healthy index of any given industry, and it is a noteworthy fact that the cement manufacturers have long since appreciated this phase of the business. The exchange of thoughts and ideas is conducive of good results in more ways than one. Ofttimes what is deemed as a secret method of doing a thing in one establishment may not be so at all, as some other manufacturer may be the possessor of the very same "secret." How we must smile at the fact that the most ordinary of operations and things connected with the business in the old days were jealously guarded as "secrets," and the operatives were forbidden to discuss them, lest some competitor might have an emissary ever ready to purloin the information! In the words of a famous cartoonist, we still smile and chuckle as we say, "Them days is gone forever!"

If any reader knows of any cement brands extant that have not been included in this series of articles, the writer would deeply appreciate their kindness and cooperation in submitting such brands, or information as to where they might be secured, in order that the collection of labels when completed may contain all, or practically all, of the trade-marks of this wonderful industry.

Trade-Marks in This Issue

A few of the trade-marks in this issue did not reproduce in their entirety, due to the same old story of color scheme. Wherever this non-reproduction is evident in any of the labels, the reader can picture for himself a label of a variety of colors and very neat in appearance in its original state, though severely plain in the reproduced form. Striking instances are labels Nos. 413, 414, 488, 494 and 500.

For several reasons the labels in this issue have been considerably reduced below their actual size, and in order that the reader may become familiar with all of them, each label is described as fully as is possible.

Turning our attention to the labels herewith presented, we find that the first one, No. 401, is of Spanish origin and represents the Cementos Portland Pamplona at Olazagutia.

The next one represents the Aktieselskabet Portland Cementfabriken, of Aalborg, Denmark.

No. 403 is the "White Star" brand of Portland Demarle, Louquet, France.

No. 404 is the "Giant" brand of Belgian cement, which was imported by Balfour, Guthrie & Co., Portland, Oregon.

No. 405 is the "Eddystone" brand of the Arlesey Lime & Portland Cement Co., an English concern.

No. 406 is the "Lyre" brand of a Belgian manufacturer, and is a brand that was no doubt exported to Mexico. (The design on the label did not reproduce on account of the colors not having the proper amount of contrast.)

No. 407 is the "Castle" brand of Belgian cement, and was exported to Purcell, Yallor & Everett, Cape Town, South Africa. (This design did not reproduce).

The next four, Nos. 408, 409, 410 and 411, are also Belgian brands, being the "Cathedral," "Lion," "Sailor" and "Dove" brands, respectively.

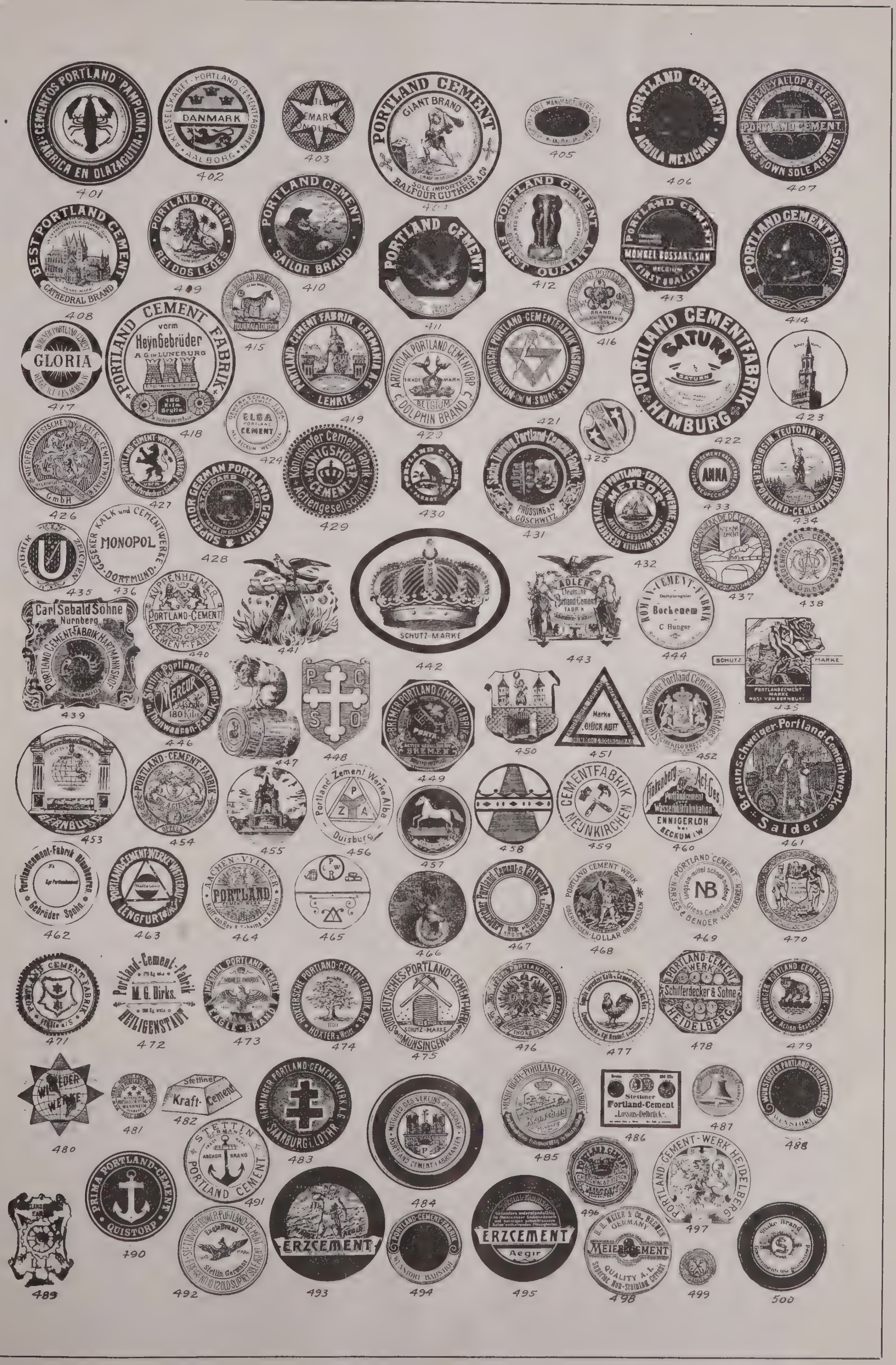
No. 412 is the "Elephant" brand, and was exported to Rio de Janeiro. This label bears the notation "manufactured for England."

Nos. 413 and 414 are the "Bear" and "Bison" brands of Belgium manufacture, the former being owned by Mombel, Bossart & Son, and it is believed the latter by Louis Volkaerts, Antwerp. (It is regretted that the designs on these two labels did not reproduce more plainly.)

No. 415 is the "Zebra" brand of the Anglo-Belgian Portland Cement Co., with headquarters at Tournai, Belgium, and London.

No. 416 shows the "Six Roupees" brand of Belgian cement, which was handled by S. Howard & Co., London.

No. 417 is the "Gloria" brand of the Burener Portland Cement Werke, Buren i. W., Germany.


CEMENTOS PORTLAND PAMPLONA FABRICA EN OLAZAGUTIA
401
AKTIESELSKABET PORTLAND CEMENTFABRIKEN DANMARK AALBORG
402
403
PORTLAND CEMENT GIANT BRAND SOLE IMPORTERS BALFOUR GUTHRIE & Co
404
405
PORTLAND CEMENT AGUILA MEXICANA
406
PORTLAND CEMENT CAPE TOWN SOLE AGENTS
407
BEST PORTLAND CEMENT CATHEDRAL BRAND
408
PORTLAND CEMENT REI DOS LEÕES
409
PORTLAND CEMENT SAILOR BRAND
410
PORTLAND CEMENT
411
PORTLAND CEMENT FIRST QUALITY
412
PORTLAND CEMENT MONNEL BOSSART SON BELGIUM FIRST QUALITY
413
PORTLAND CEMENT BISON
414
TOURNAI LONDON
415
BRAND
416
GLORIA
417
PORTLAND CEMENT FABRIK vorm Heyn Gebrüder A.G. in LUNEBURG
418
PORTLAND-CEMENT-FABRIK GERMANIA A.G. LEHRTE
419
ARTIFICIAL PORTLAND CEMENT DOLPHIN BRAND BELGIUM TRADE MARK
420
NORDDEUTSCHE PORTLAND-CEMENTFABRIK MISBURG A.G.
421
PORTLAND CEMENTFABRIK SATURN HAMBURG
422
423
ELSA PORTLAND CEMENT
424
425
GmbH
426
427
SUPERIOR GERMAN PORTLAND CEMENT
428
Königshofer Cementfabrik KÖNIGSHOFER CEMENT Actiengesellschaft
429
PORTLAND CEMENT
430
Portland-Cement-Fabrik PRÜSSING & Co GÖSCHWITZ
431
METEOR
432
ANNA
433
TEUTONIA PORTLAND-CEMENTWERK
434
FABRIK ZEICHEN U
435
GESEKER KALK und CEMENTWERKE MONOPOL DORTMUND
436
437
CEMENTWERKE GmbH
438
Carl Sebald Söhne Nurnberg PORTLAND CEMENT-FABRIK HARTMANNSHOF
439
KUPPENHEIMER PORTLAND-CEMENT CEMENTFABRIK
440
441
SCHUTZ MARKE
442
ADLER Deutsche Portland Cement FABRIK
443
ROHN CEMENT-FABRIK Bockenem C Hunger
444
SCHUTZ MARKE PORTLANDCEMENT
445
Stettin Portland Cement MERCUR 180 Kilo Thonwaaren-Fabrik
446
447
P C S O
448
BREMER PORTLAND CEMENT FABRIK BREMEN
449
450
Marke GLÜCK AUF!
451
Bredower Portland Cementfabrik Actien
452
BERNBURG
453
PORTLAND-CEMENT-FABRIK
454
455
Portland Zement Werke Alba P Z A Duisburg
456
457
458
CEMENTFABRIK NEUNKIRCHEN
459
Finkenberg Act-Ges. Portlandcement Wasserschüttfabrikation ENNIGERLOH BECKUM i.W.
460
Braunschweiger Portland Cementwerke Salder
461
Portlandcement-Fabrik Gebrüder Spohn
462
PORTLAND CEMENT WERK LENGFURT
463
AACHEN-VYLENER PORTLAND CEMENT WERK
464
465
466
Portland Cement & Kalkwerk
467
PORTLAND CEMENT WERK OBERHESSEN-LOLLAR OBERHESSEN
468
PORTLAND CEMENT NB HARJES & BENDER KUPFERDREH
469
470
PORTLAND CEMENT FABRIK
471
Portland-Cement-Fabrik M. G. Dirks. HEILIGENSTADT
472
IMPERIAL PORTLAND CEMENT HIGHEST AWARDS EAGLE BRAND
473
HÖXTERSCHE PORTLAND-CEMENT-FABRIK HÖXTER a. Weser
474
SÜDDEUTSCHES PORTLAND-CEMENTWERK SCHUTZ MARKE MÜNSINGEN
475
476
477
PORTLAND-CEMENT WERK Schifferdecker & Söhne HEIDELBERG
478
PORTLAND CEMENT FABRIK
479
WIEDER WERKE
480
481
Stettiner Kraft-Cement
482
PORTLAND-CEMENT-WERK A.G. SAARBURG i. LOTHR.
483
MITGLIED DES VEREINS DEUTSCHER PORTLAND CEMENT FABRIKANTEN
484
PORTLAND-CEMENT-FABRIK
485
Stettiner Portland-Cement
486
487
488
489
PRIMA PORTLAND-CEMENT QUISTORP
490
STETTIN GERMANY ANCHOR BRAND PORTLAND CEMENT
491
Eagle Brand Stettin German
492
ERZCEMENT
493
PORTLAND-CEMENT-FABRIK
494
ERZCEMENT Aegir
495
PORTLAND CEMENT
496
PORTLAND-CEMENT-WERK HEIDELBERG
497
H. H. MEIER & Co. BREMEN GERMANY MEIER CEMENT QUALITY A.1.
498
499
Brand
500

In the next we have a reminder of the old method of cement manufacture. It is the label of the Portland Cement Fabrik, A. G., Luneburg, Germany, and was formerly operated by Heyn Bros. This label bears the instructions that the barrel is to be opened at the other end.

No. 419 is the label of the Germania Portland Cement Fabrik, located in Lehrte, Misburg and Ennigerloh, Germany.

No. 420 is the "Dolphin" brand of the Artificial Portland Cementorp, a Belgian concern.

No. 421 shows the brand of the Norddeutsche Portland Cementfabrik in Misburg, Germany, and No. 422 reveals the well-known "Saturn" brand of a mill at Hamburg.

No. 423 represents a German brand, but the identifying information was never at hand. Same is true of No. 425.

No. 424 is the "Elsa" brand of the Elsa Portland Cement Works, in Neubeckum, Westfalen, Germany.

No. 426 shows us the label of the Neiderschlesische Lime & Cement Works, Neukirch, Germany.

The lion shown in No. 427 represents the Heidelberg Portland Cement Works, which was formerly operated by Schifferdecker & Sons.

No. 428 is the "Superior Standard" brand of German cement, and the design on the label is a briquette testing machine, but this did not reproduce very well.

No. 429 represents the "Crown" brand of the Konigshofer works in Germany.

No. 430 is the "Parrot" brand of Belgian origin.

The remainder of the trade-marks shown (from No. 431 to 500) are all of German ownership, and no mention will be made of the country in the following descriptive matter.

No. 431 is a coat of arms, the design of the Sachs, Thuring Works in Goschwitz.

No. 432 is a very pretty design, being the "Meteor" brand of the Geseker Lime & Portland Cement Works, located in Geseke, Westfalen.

No. 433 has a very feminine touch, and is the brand of that company located in Neubeckum.

Behold in No. 434 the famous "Teutonia" brand of the Misburger Portland Cement Works in Hanover.

No. 435 is the unique design of the Zeichen works, location not known.

Please look carefully at the next one, which is the "Monopol" trade-mark of the Geseker Lime & Cement Works, in Dortmund. The literal translation of the brand name is "Exclusive right to manufacture." How is it possible to enjoy a monopoly in the cement business in this age of anti-trust laws?

No. 437 depicts a train of cars crossing a concrete bridge, and is the "Nekar" brand of the Neckarelz works in Diedesheim.

No. 438 represents the Diedenhofener Cementfabrik. whose exact location is not known to the writer.

No. 439 is the "Ammoniten" brand of the Portland Cementfabrik Hartmannshof, Carl Sebald Sons, Nurnberg. The ammonite, from which the trade-mark derives its name, is a genus of fossil shells, which are found throughout the entire series of fossiliferous rocks. It would be interesting to know just why this strange trade-mark was adopted by this concern.

No. 440 shows the Kuppenheimer company's trademark.

No. 441 is the "Eagle" brand of some manufacturer, whose name and location are not known.

The crown depicted in No. 442 is the trade-mark of the well-known Hemmoor Company, Hamburg, several of whose other labels were shown in previous issues.

No. 443 is the "Eagle" brand of the Adler Portland Cementfabrik, Zossen and Berlin.

No. 444 is C. Hunger's Roman Cement Fabrik, located in Bockenem.

No. 445 depicts a rose, and the trade-mark is entitled: "The Rose of Dornburg."

The next brand represents the "God of Trade," being the "Mercur" brand of the Stettin Portland Cement und Thonwarren Fabrik.

No. 447 is a brand whose owner and location are unknown. This is also true of No. 448, showing a shield with a trefoil cross, surrounded by the letters P. C. S. O., which are evidently indicative of the firm name.

No. 449 reveals the "Porta" brand of the Bremer Portland Cement Fabrik, located in Bremen. You will notice in the center the key to the gate (porta).

The triangular trade-mark shown by No. 451 represents the Ennigeroher works of Grimberg & Rosenstein, Guck Auff.

No. 452 is the striking design of the Stettin-Bredower works, Stettin.

The suspended globe shown in No. 453 represents the product of the Bernburger works.

No. 454 is the brand of A. Giesel, Oppeln.

No. 456 represents the Alba Portland Zement Works, located in Duisburg.

Nos. 455, 457 and 458 are unknown to the writer.

The hammers shown in No. 459 belong to the plant located in Neunkirchen.

No. 460 is the brand of the Finkenberg Portland Cement & Waterlime Works, at Eiingerloh in Westfalen.

No. 461 shows the Braunschweiger company's label, which is located in Salder.

No. 462 is Spohn Brothers' Blaubeurer works.

No. 463 represents the "Wetterau" brand of the Wetterau Portland Cement Works in Lengfurt.

The next is the Aacher-Vylener works located in Aachen.

Nos. 465 and 466 are unknown.

No. 467 shows the Lengericher Portland Cement & Lime Works, Munster and Lengerich.

No. 468 is the label of the Oberessen works in Lollar.

No. 469 represents the product of Narjes & Bender, Kupferdreh. The label bears the notation that this is either slow, medium or quick setting Giess cement.

No. 470 is the label of Portland Cement Fabrik Hub Vandenesch, Rupen.

The shield on No. 471 represents the Portland Cement Fabrik, Halle a. S.

No. 472 shows the trade-mark of M. G. Birks' plant at Heiligenstadt.

No. 473 shows the "Imperial Eagle" brand of German cement.

The "Tree" brand shown next is the property of the Hoxtersche Portland Cement Fabrik, Hoxter on the Weser.

The "Beehive" brand represents the Suddeutsches Portland Cement Works in Munsingen.

No. 476 is the label of the Groschwitz Portland Cement Fabrik.

The "Cockerel" brand next shown belongs to the Gogolin-Gorasdzer Lime & Cement Works, located in Neudorf.

No. 478 shows the Schifferdecker & Sons label, which plant is located in Heidelberg.

No. 479 is a striking design and represents the Bernburger Portland Cement Fabrik's "Garantir Reiner" cement.

The octagonal design next shown is the brand of the Wilkeder cement works.

No. 481 shows the "3-star" brand of the Mannheimer plant in Mannheim.

The concrete block shown in No. 482 is the output of the Kraft Stettiner Cement Works.

The Lorraine Cross depicted in No. 483 is the brand of the Heminger Portland Cement Fabrik, Saarburg in Lothr.

No. 484 is a very striking design, but did not reproduce properly. It is the brand of the Mitteldeutsche Portland Cement Fabrik, Prussing & Co., Schoenbeck, Elbe.

No. 485 is the "Kronsberg" brand of the Misburger Portland Cement Fabrik, located in Misburg.

No. 486 is the "Lossius-Delbruck" brand of Stettin portland cement.

No. 488 is the "3-leaf clover" brand of the Wunstorfer Portland Cement Fabrik in Wunstorf.

No. 490 shows the "Anchor" brand of Prima Portland Cement manufactured in Quistorp.

No. 491 is another "Anchor brand," made in Stettin.

No. 492 was the label used by F. Behrend, New York, Sales Agent for the Stettin-Bredower company's "Eagle" brand.

Nos. 493 and 495 are two of the labels representing the Erzcement" of the Hemmoor Company, Hamburg.

No. 494 is the "4-leaf Clover" brand of Schmidt, Brosang & Co., which plant is located in Wunstorf, Bahnhof.

No. 496 is the label of C. H. Bocking & Dietsch, being the "Crown" brand made in Malstatt.

No. 497 represents the "Lion" brand of the Heidelberg Portland Cement Works, Heidelberg.

No. 498 is the "Superior non-staining" brand of H. H. Meier & Co., Bremen.

The small label next shown is the "Double Anchor" brand of a firm having a much larger name, being that of the Wickingsche Portland Cement und Wasserkalk Werke, Recklinghausen.

No. 500 is the "Superior Snake" brand of Paul Adler, Hamburg. This is a very pretty label in its original colors.

Portland Cement Output in June

The statistics shown in the following tables issued by the Department of the Interior, and prepared under the direction of Ernest F. Burchard, of the Geological Survey, are based mainly on reports of producers of portland cement but in part on estimates. The estimates for June, 1923 were made necessary by the lack of returns from three producers.

Stocks of clinker, or unground cement, at the mills at the end of June, 1923, amounted to about 4,154,000 barrels compared with 4,470,000 barrels (revised) at the beginning of the month.

The Bureau of Foreign and Domestic Commerce, of the Department of Commerce, reports that the imports of hydraulic cement in May, 1923, amounted to 88,480 barrels, valued at $162,877. The total imports in 1922 amounted to 323,823 barrels, valued at $628,846. The imports in May were: from Quebec and Ontario Provinces, Canada, 35,304 barrels; Norway, 29,948 barrels; Belgium, 12,415 barrels; Germany, 6,952 barrels; Sweden, 2,526 barrels; other countries, 1,335 barrels. The imports were received in the following districts: Florida, 23,192 barrels; Vermont, 13,154 barrels; Georgia, 12,403 barrels; New Orleans, 12,350 barrels; St. Lawrence, 10,527 barrels; Buffalo, 8,871 barrels; Los Angeles, 2,526 barrels; Rochester, 2,109 barrels; other districts, 3,348 barrels.

The exports of hydraulic cement in May, 1923, were 103,634 barrels, valued at $355,299, of which were sent to Cuba, 43,873 barrels; to the other West Indies, 4,731 barrels; South America, 37,226 barrels; Mexico, 7,821 barrels; Central America, 5,370 barrels; Canada, 1,634 barrels; and to other countries, 2,979 barrels. The total exports of hydraulic cement in 1922 were 1,127,845 barrels, valued at $3,206,201.

The statistics of imports and exports of hydraulic cement in June, 1923, are not available.

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT BY MONTHS IN 1922 AND 1923, IN BARRELS

Month	Production		Shipments		Stocks at end of month	
	1922	1923	1922	1923	1922a	1923
January	*a*4,291,000	7,704,000	*a*2,931,000	5,419,000	13,316,000	*a*11,470,000
February	4,278,000	8,085,000	3,285,000	5,963,000	14,142,000	*a*13,502,000
March	6,685,000	9,880,000	7,002,000	10,326,000	13,848,000	*a*13,045,000
First quarter	15,254,000	25,669,000	13,218,000	21,708,000	....	....
April	9,243,000	11,359,000	8,592,000	12,954,000	14,470,000	*a*11,463,000
May	11,176,000	12,910,000	12,749,000	14,257,000	12,893,000	*a*10,144,000
June	11,245,000	12,382,000	13,470,000	13,307,000	10,718,000	9,219,000
Second quarter	31,664,000	36,651,000	34,811,000	40,518,000	....	....
July	11,557,000	....	13,850,000	....	8,433,000	....
August	11,664,000	....	14,361,000	....	5,746,000	....
September	11,424,000	....	12,444,000	....	4,724,000	....
Third quarter	34,645,000	....	40,655,000	....	....	....
October	12,287,000	....	12,854,000	....	4,149,000	....
November	11,349,000	....	10,167,000	....	5,320,000	....
December	8,671,000	....	4,858,000	....	9,267,238	....
Fourth quarter	32,307,000	....	27,879,000	....	....	....
Preliminary total	113,870,000	....	116,563,000	....	....	....
Amount of under estimate	919,984	....	1,138,216	....	....	....
Final total	114,789,984	....	117,701,216	....	....	....

(*a*) Revised.

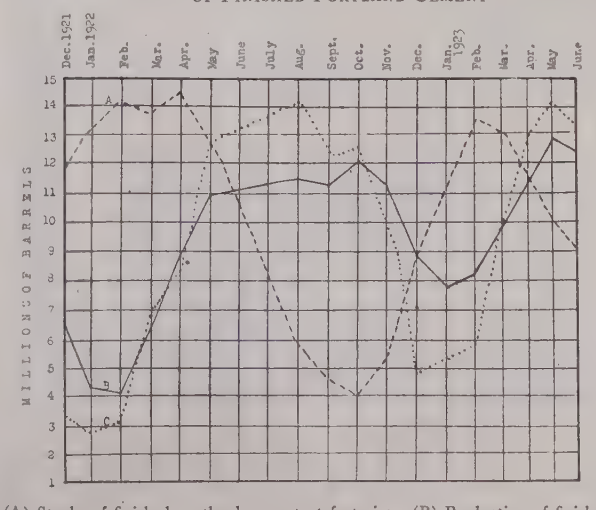
IMPORTS AND EXPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1922 AND 1923, IN BARRELS

Compiled from records of the Bureau of Foreign and Domestic Commerce.

(b) Imports and exports in June, 1923 not available. (c) Covers period Sept. 1-21, Imports Sept. 22-30 included with Oct. (d) Includes imports period Sept. 22-30.

Month	Imports		Exports	
	1922	1923	1922	1923
January	17,039	71,686	70,725	73,169
February	5,157	20,529	82,421	88,624
March	1,579	66,521	103,556	98,861
April	10,855	76,416	75,412	85,662
May	2,524	88,480	100,068	103,634
June	14,198	(b)	96,263	(b)
July	957	.....	119,491	.....
August	56,757	.....	105,156	.....
September	(c) 42,641	.....	78,615	.....
October	(d) 65,228	..	80,402	..
November	61,010	.....	108,798	.....
December	45,860	.....	106,938	.....
	323,823		1,127,845	..

MONTHLY FLUCTUATIONS IN PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT

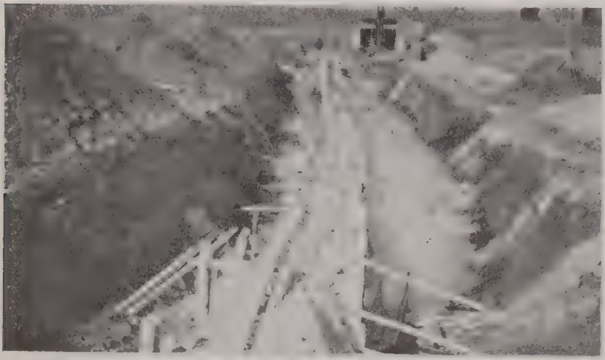


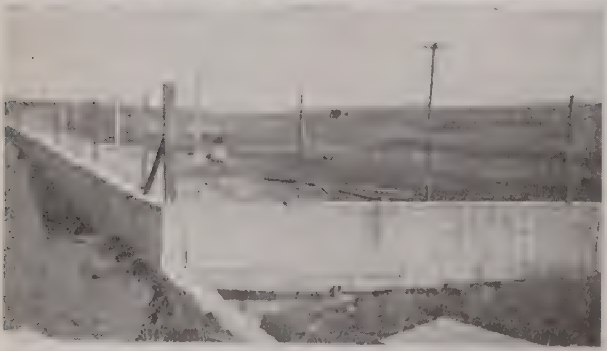
(A) Stocks of finished portland cement at factories. (B) Production of finished portland cement. (C) Shipments of finished portland cement from factories.

Employment Twelve Months of Year

It is the policy of the Fredonia Portland Cement Co., Fredonia, Kansas, to employ steady labor and it is the firm belief of Frank H. Patterson, president and general manager of the company, that steady employment should be afforded the workmen throughout the entire year including the time when the plant is shut down. The floater type of labor is not only demoralizing to an industry itself but reacts unfavorably upon the community; for it gives no inducement toward permanent residence and permanent type of citizenship. In order to give employment to his workers during a recent shut down, Mr. Patterson constructed a fish pond on the land in the vicinity of the plant.

A concrete dam which was sunk to a depth of about 6 ft. beneath the surface of the ground and which rises to a height of 10 ft. or 12 ft. was built at the south end of the proposed pond where it cuts across the bottom of Clear Creek. A second dam had already been constructed north of this dam to serve as an added water break. Concrete walls topped by fine mesh wire extend along the pond for about 600 ft. and at the north end for 300 ft. across the pond. Snakes and other reptiles can be kept out of the pond, and to insure against high waters from the creek, a dyke is being constructed to provide against overflow and flooding.





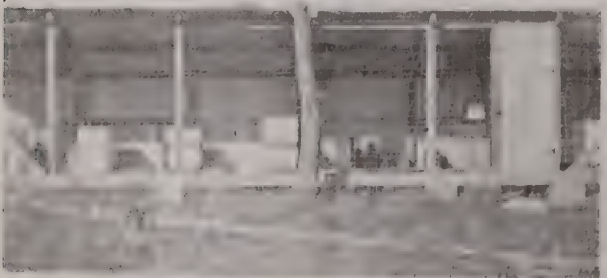


Fig. 1—The Lower Dam for the Fish Pond under Construction

Fig. 2—View of the Upper Dam and Side Walls of the Fish Pond

Fig. 3—The Bee Hives

Application has been made for a fish supply and hatchery from the fish and game warden at Pratt, Kansas. Mr. Patterson is making a thorough and scientific study of fish and is considering the best type for the pond. While some fish are more prolific than others, there are certain drawbacks to be encountered in stocking fish inclined towards cannibalism and food debauchery. The propagation of fish is a science and Mr. Patterson entering into the field with a modern fish pond reveals his talent along various lines of endeavor.

Not only has the fish pond been constructed on the cement plant acreage but during one year tobacco was planted and grown. Only one worker was hardy enough to withstand the aroma and strength of the weed and the major harvest still hangs in one of the out-buildings with no provisions against anyone who would help himself. There is some difference between tobacco in the raw and tobacco in the tin can.

Then, a building with one side left open and a fine wire mesh stretched across it has been constructed for sheltering bee hives. Across the faces of the doors and tacked against a tree are warnings "Dangerous Explosives" which have effectually kept out all visitors who would pry into the hives. The result of this expenditure has been highly gratifying and it adds a sort of picturesque atmosphere to the gray buildings.

Originality is in evidence over the entire plant which has been improved from the date of its installation until it is modern in every respect. The employees have been kept busy through all shutdowns and they have responded to the twelve months system of employment by loyalty and permanent service to the cement company management.

Quicklime for Use in the Manufacture of Sulphite Pulp

The manufacture of sulphite pulp, which is a major ingredient in paper, utilizes about 300,000 tons of quicklime and at least an equal amount of limestone annually. It is of importance to the public, therefore, that the quality of limestone and quicklime used by this industry shall be that best adapted to the purpose. This proper adaptation will affect not only the economy of manufacture of the sulphite pulp, but it will also result in the better utilization of an important natural resource in limestone. From the producers of sulphite pulp was ascertained the quality of the material best suited to their needs; from the producers of limestone and quicklime was ascertained the closeness with which these requirements may be met economically. The results have been embodied in these specifications.

This specification is embodied in Circular 144 of the Bureau of Standards, entitled, "Recommended Specifications for Quicklime for Use in the Manufacture of Sulphite Pulp." Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price is 5 cents.

The Standard Inspection Co. has retained P. J. Freeman, M. E., as consulting engineer and technical adviser on all of its contracts relating to concrete materials and construction, testing of power plants, pumping machinery, and special investigations. Mr. Freeman will occupy offices with the company at 311 Ross Street, Pittsburgh, Pa.

Men and Mills

Notes from the Field

The construction of the cement plant of the Sun Portland Cement Co., Lime, Ore., is well under way and it is expected to be in full operation not later than October 1st.

The personnel of the organization is as follows:

F. E. Coffey, chief engineer; H. Elliott, superintendent of construction; A. R. Moore and Charles Mockmore, field engineers; Stuart Simms, E. Roberts and C. A. Kaempff, draftsmen; B. B. Pierce, electrical engineer; James Haggart, mechanical engineer; E. E. LeClaire, office manager and Pat Ludgate, chief chemist.

The plant is located on the main line of the Union Pacific at Lime, Ore., about 4 miles west of Huntington, where there is an inexhaustible supply of lime rock and shale, comprising about 700 acres. Lime rock and shale are used in manufacture, oil being used as fuel, the process being wet. The entire grinding equipment is being supplied by F. L. Smidth and Co. of New York; the kiln, which is 9 ft. x 10 ft. x 210 ft. long, was supplied by the Vulcan Iron Works, of Wilkes-Barre; concrete chimney, now under construction, by the Heine Chimney Co. of Chicago; elevating and conveying machinery by Link-Belt Co.; silent chain drives Link-Belt Co.; crushing equipment, Smith Engineering Works, Milwaukee; aerial tramway, American Steel and Wire Co., Trenton, N. J.; gear reducers by Foote Bros. Gear & Machinery Co., Chicago; entire electrical equipment, Allis-Chalmers Co. Milwaukee; air compressors and drills, Ingersoll-Rand Co. and gas electric shovel by the Marion Steam Shovel Co.

J. R. Fairman has been appointed district engineer in charge of a new Association office just opened in Birmingham in the Jefferson County Bank Building. This office will have charge of association activities in Alabama.

James A. Hudson has been appointed district engineer in charge of a new association office just opened in Memphis, in the Exchange Building. This office will have charge of association activities in Tennessee.

P. H. Johnston has been appointed district engineer in charge of a new association office just opened in the Graham Building, Jacksonville. This office will have charge of association activities in the state of Florida.

M. E Davis, who has, for several years past, had charge of the New York office of the Vulcan Iron Works, is no longer connected with that company and Thomas MacLachlan of Willkes-Barre has been appointed to take his place.

Walter B. Elcock has been appointed assistant general manager in charge of the southeastern offices of the Portland Cement Association. Mr. Elcock joined the staff in 1914 and has since been continuously with the Association, excepting for two years spent in the army during the war as Major of Infantry.

The Texas Portland Cement Co. is, at the present time, adding the third kiln with the necessary raw and finished machinery, to its Houston plant to bring the capacity up to the present capacity of its Dallas mill. Originally the Houston mill was designed with a two-kiln unit, but only one kiln was put in at the time. About two years later the second kiln was installed, and it is estimated that the addition of the third kiln will double its original capacity.

March, 1924 will see the Kansas Portland Cement Co.'s plant at Bonner Springs, Kansas, entirely rebuilt and one of the most modern, efficient plants in the United States. In a short time men will be at work building a new plant just north of the present site. During the construction of the new plant, the old one will be operated as usual.

In the new plant the wet process will be used. The capacity of the plant will be at least doubled.

According to superintendent Loveland, the contract has already been let to a New York firm for the construction of the kiln stacks, which are to be of reinforced concrete, 205 ft. high, and 15 ft. in diameter at the base. Other contracts will be let at once and actual construction work will be started in the near future.

M. W. Locklin, for the past three years superintendent of the Pacific Portland Cement Co.'s plant at Cement, Calif., died July 14 at Pacific Grove where he had gone about a month before in the hope of benefitting his failing health. H. M. Power has been appointed superintendent to fill the vacancy.

John W. Reynolds, a well known resident of Coplay, Pa., and for a quarter of a century employed as a foreman for the Lehigh Portland Cement Co., died July 11, aged 58 years.

A large crane is being built at the plant of the Giant Portland Co.

The Pennsylvania Portland Cement Co. has added the fourth new electric shovel for the quarry and is about to add another crusher. Another 50-ft. strata of rock in the quarry will soon be opened up, which will bring the depth to 210 ft. at some places. Plenty of orders are on hand.

Two cargoes of cement which were due to arrive at Wilmington, N. C., from England and Denmark the middle of July, will complete the fifteen shiploads ordered by the Southern Power Co., of Charlotte, to be used in construction work on Mountain Island, N. C., development and Dearborn Power station at Great Falls, S. C.

The thirteen cargoes already received have averaged 20,000 bbls. or 2,500 tons. The cement was ordered eighteen months ago.

Officials of the Southern Power Co., say that by far the greater part of the cement has been for use at the Mountain Island development near Charlotte. Part of the cargoes has been used on the Dearborn station and some of it at the new steam plant additions at Mount Holly and Eno.

So far as is known the cement importation from abroad by the Southern Power Co. constitutes the largest order ever brought into this country. The orders were first placed when work was started on the two developments at Mountain Island and at Great Falls.

No decision has been received by W. D. Ege, trustee, from Judge Yoemans, covering the hearing concerning the Choctaw Portland Cement Co. before him at Hugo, Okla., on June 24, 1923. It is expected that a decision will be handed down by Judge Yoemans about Oct. 1.

The demand for cement in Hawaii is much greater than it was last year, reports John Gleave, in charge of the office force of the Olympic Portland Cement Co. The company has made several shipments to Honolulu this year and others are in early prospect. The company's plant is running day and night to fill its orders.

The Superior Portland Cement Co. is building a double tennis court on its ground just west of the new office building, and when finished it will be one of the finest courts in this section of the state. The ground has been graded and the cement floor of the court is now being laid, and the necessary equipment will be installed within the next few weeks.

The Monolith Portland Cement Co. at Monolith Calif., has been enlarged and mechanical installations are under way to bring the plant up to a daily capacity of 3,000 bbls. and other equipment is ordered to be installed later which will make the capacity of the plant 4,500 bbls. a day. The product of this plant is a cement which is both waterproof and plastic.

John Gleave, office manager for the Olympic Portland Cement Co., with Mrs. Gleave, has just returned from a three months' tour that took them through Europe. In England, he found many unemployed and vast numbers of men and women receiving government doles, which are not an incentive to industrial endeavor, he believes. Mr and Mrs. Gleave spent about a month in that country most of it in Lancashire, where Mr. Gleave has relatives whom he had not seen for thirty-one years.

Mr. and Mrs. Gleave followed the Hindenburg battle line for more than 400 miles and observed that the French are working hard to restore that shell-torn region.

Fire in the finished grinding, packing and loading departments of the Huron Portland Cement Co., Alpena, Sunday, July 29, will probably force a complete suspension of cement production and shipment until very early September, according to the *Alpena News*. J. W. Boardman, vice-president and manager of the company, spoke highly of William B. Harris, general manager of the plant, for the manner in which he had met the emergency and organized his forces to return the plant to operation at the earliest possible moment. A construction crew is working 24 hours a day, in three 8-hour shifts, the first work being the removal of the wreckage. New machinery and parts are already on the way to Alpena.

Otto E. Zeigler, hospital steward at the plant of the Pacific Portland Cement Co., at Cement, has filed a suit against that company for $15,000 damages, alleged to have been sustained through the loss of his infant daughter, who drowned a few months ago in a pool of water owned by the company.

The complaint alleges that the company keeps a pool of water back of the hotel at Cement, which is used for mill work and as a swimming pool for the employes, and that the company was negligent in allowing grass to grow around the edge of the pool and in allowing the fence surrounding it to become broken.

The Interior Department announces that returns received by the Geological Survey from the producers of potash in the United States indicate that the output in 1922 amounted to 25,176 short tons of crude potash salts containing 11,714 short tons of actual potash (K^2O). The sales amounted to 22,028 short tons of crude potash containing 11,313 tons of (K^2O) valued at $463,512. About 30,000 short tons of crude potash were held by the producers December 31, 1922.

Among the exhibits of interest to the tanner and leather finisher at the 1923 Chemical Exposition, which will be held at the Grand Central Palace, New York, during the week of September 17 to 22, will be a display by the National Lime Association, representing a great majority of the big lime producers of the United States. All kinds of lime, its uses, old and new, packing, shipment, handling, including new adaptions for the tannery, will be demonstrated.

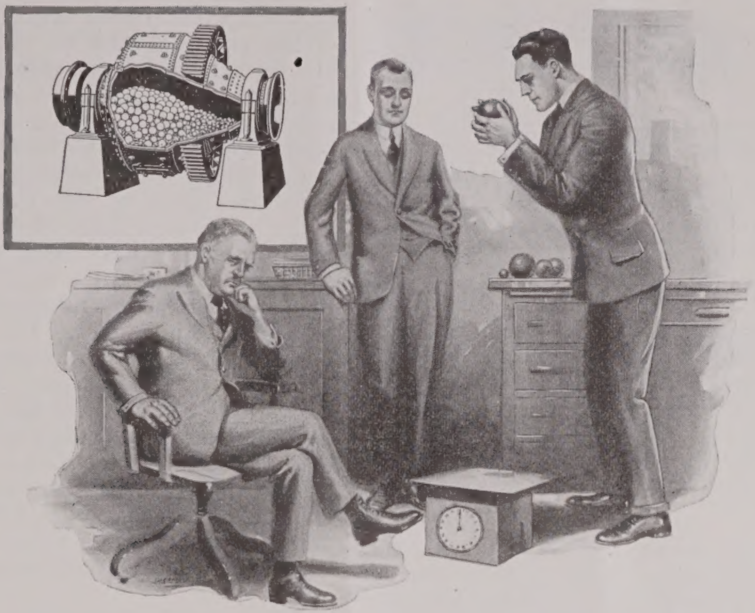
Not only are the present freight rates on cement from Hannibal and St. Louis, Mo., and Buffington, Ind., mills too high on shipments to Illinois points but interstate rates on cement in Illinois are unduly preferential of producers in that state and prejudicial against Hannibal, St. Louis and Buffington shippers. The rates on cement within Indiana also have been found preferential of producing points in that state, under a recent decision of the Interstate Commerce Commission on complaint of the Atlas Portland Cement Co. and others, and prejudicial against Hannibal mills, and the rate from Hannibal to Indiana points has been found unreasonable. The railroads have been ordered to establish reasonable rates prescribed by the Commission on or before October 12.

Operation of a proposed tariff filed by the Atchison, Topeka & Santa Fe Ry. and the Missouri-Kansas & Texas R. R. to increase to 50,000 pounds the carload minimum weight on cement from points in Colorado, Kansas and Oklahoma to various destinations in Southwestern territory, has been suspended until November 6 by the Interstate Commerce Commission pending investigation. Minimum weights now range from 30,000 to 40,000 pounds.

The Lehigh Portland Cement Co., on behalf of its mill at Iola, Kans., has filed a complaint asking the Interstate Commerce Commission to establish new freight rates on cement from Iola to Oklahoma points. The company protested that the present rates are preferential of competing mills at Ada and Dewey, Okla. Reparation on past shipments also was requested.

Refusal of the Chicago, Rock Island & Pacific R. R. to establish a track connection at Courtland, Kans., materially has damaged the Nebraska Portland Cement Co., operating a plant at Superior, Nebr., and competing in the sale of cement in Kansas, according to a complaint filed with the Interstate Commerce Commission by the cement company. The company is forced to pay unreasonable rates and declares that shipments of cement from the Superior mill to Kansas points are delayed because of the use of circuitous routes which the track connection would eliminate.

Robert W. Hunt, founder of the inspection firm, Robert W. Hunt Co., died July 11, 1923.



It's the "Kick" at the Bottom That Counts in Pulverizing

Drop any ball from a height on scales and you will note the amount indicated will be many times its dead weight.

If the weight in striking underground material at the bottom of a mill is too large, it not only expends surplus energy, but actually increases the wear.

By proper regulation of the size of ball and height of fall, energy is saved and wear on balls and lining is materially reduced.

The Hardinge Conical Mill is the only grinding device capable of automatically segregating the balls in proportion to the size of material being pulverized, thus preventing the cushioning effect which otherwise occurs. This results in reducing the power consumption and wear, and makes an unusually smooth-running machine requiring practically no attention.

Our Bulletin No. 13 explains why. Write for a copy.

HARDINGE COMPANY
120 BROADWAY, NEW YORK, N.Y.
BRANCH OFFICES
SALT LAKE CITY, UTAH: NEWHOUSE BUILDING
LONDON, ENGLAND: 11 SOUTHAMPTON ROW

WORKS
YORK, PENNA.
MONTREAL, QUE.
ERITH, ENG.

CABLE ADDRESS
"HARDINGMIL NEW YORK"

Hardinge Conical Mills

German Observations on Cement

Dr. Otto Schott has recently published a series of observations on cement, based on experiments which have in some cases lasted as long as six years.

He found, for instance, that if a thin pat of neat cement is suspended in a shallow air-tight vessel of water, crystals of calcium hydrate gradually form, and in six years are clearly visible to the naked eye. This experiment clearly proves that water can decompose portland cement, forming simple compounds and calcium hydrate and from it Dr. Schott concludes that the hardening of cement is chiefly due to the adhesion of the particles of silicate, the spaces between them being filled with the crystalline hydrate. He considers that this explains why cements rich in lime and those which are exceptionally finely ground harden more rapidly than others. He regards expansion and the resulting cracking as due to the formation of an excess of the calcium hydrate crystals from a cement unduly high in lime.

In addition to the crystals just mentioned, Dr. Schott observed a gelatinous growth of mono-calcium silicate. A series of 168 cements was made from pure silica, pure alumina, pure iron oxide and pure lime, the mixtures being burned in an electric furnace at a temperature high enough to effect sintering. The temperature varied with the composition of the mixture; in some instances it reached 2,000 C. with cements rich in iron oxide or alumina. Iron oxide behaved curiously, as it increased the sintering temperature of mixtures rich in that oxide, but in smaller proportions it acted as a flux.

A micro-petrographic examination of the cements showed the following: The aluminous cements contained small crystals of calcium aluminate ($2\ CaOAl_2O_3$). A cement composed wholly of this substance is only feebly doubly refractive, but one composed of tricalcium ferrite ($3\ CaOFe_2O_3$) is strongly doubly refractive, though much less transparent. Some of the clinkers contained definite crystals with double refraction and a composition corresponding to Janecke's compound ($8\ CaO,\ 2\ SiO_2,\ Al_2O_3$), while the corresponding iron compounds produced beautiful crystals with strong double refraction.

The cements rich in alumina were very difficult to work, and even when mixed with 2% of gypsum required about an hour to set. The corresponding iron cements set in 10 to 20 minutes.

Compression tests showed that the strength is roughly proportional to the lime content until the tri-calcium compounds are formed. An excess of lime then causes cracking, and consequent weakness. The iron oxide cements set very slowly and are weaker than the alumina cements, yet reached 5,600 lbs. per sq. in. in 28 days. The hardness was greatest with aluminous cements, but an excess of alumina is harmful, as it causes cracks.—*Tonindustrie Zeitung.*

The finishing touches are being put on the first unit of a new cement plant for the Carney Cement Co. at Carney, Minn. This unit has an output of 1500 bbls. per day and is just one-fourth the capacity of the plant when completed. The combined production of the new unit and the old plant is 4500 bbls. of Carney cement per day and when the new plant is completed it is estimated the daily capacity will be 9000 bbls.

Caterpillar Tractors in Quarries

Caterpillar tractors of the 10-ton and 5-ton type have been and are being used in connection with quarry operation with very good results. Among some of the principal uses to which tractors are put are: moving heavy pumps and motors in pits, pulling heavy pipe and other equipment around mines and quarries, pulling stumps, stripping waste material from the quarries, excavating for buildings, building tank dams, and grading roads around quarries and plants.

At the plant of the Texas Cement Plaster Co., Hamlin, Texas, a 5-ton Holt tractor and three Baker Maney scrapers have been used for stripping gypsite deposits. An average of 375 yds. of dirt has been moved with tractor and scrapers for a distance of 150 yds. in a 10-hour day. The consumption of gas and oil under these conditions was on an average, 12 gallons of gas and 1 qt. of oil a day. The tractor has been used as a switch engine when necessary, bringing cars from the main track, a distance of 1½ mi. to the mill. As many as 35 empty box cars at a time have been moved. At one time, 9 loaded cars and 2 empties were moved, the loaded cars containing 279 tons of plaster. During the rush season when it is impossible to get a switch engine the tractor is used for switching in the company's yards.

The tractor is put to very severe tests in connection with quarry operation and around the plant and is often called upon to operate in muddy pits to cross ditches, to go up steep inclines and cross pipe lines, logs, etc.

This information is furnished through the courtesy of the Holt Manufacturing Co., Peoria, Ill.

Trade Publications

The Ingersoll-Rand Co., 11 Broadway, New York, has just issued a new 36-page bulletin describing its Imperial type XPV steam driven air compressors. The bulletin is 6 in. by 9 in., 36 pages.

This compressor is built in a number of different types and sizes. Standard two-stage machines for 100 pounds discharge pressure, range from 246 to 4,150 cu. ft. per min. piston displacement. Single-stage compressors are built for furnishing air up to 50 pounds discharge pressure. In their bulletin the manufacturers call particular attention to the steam valve gear which is used on these compressors.

One of the outstanding features of type XPV compressors is the automatic cutoff governor which regulates the compressor. Other features of design which are illustrated and described in detail in this bulletin include the Ingersoll-Rand plate air valves which are used for both intake and discharge; the unit construction which requires a very simple foundation; and the automatic flood system of lubrication.

Weston Direct Drive Gyratory Crusher. This is a 4-page folder, size 8½ in. x 11 in. issued by the Morgan Engineering Co., Alliance, Ohio, describing and illustrating the Weston direct drive gyratory crusher, designed as a rejection machine for following primary crushers and for reducing oversize gravel and all other operations where it is desired to reduce hard rock or ore.

The folder includes a complete description of the construction, lubricating system and tests of this equipment.

Opening of a big cement import trade to Portland, Ore., is predicted by W. W. Kirby, local agent for the American Finance & Commerce Co., who announced the coming of the motorships Buenos Aires and Halfried from Sweden with a total of 11,000 tons of cement.

The Calera Lime Co.'s plant at Calera, Ala. is being operated on full time, and turning out one of the best grades of lime in the south. The capacity of the plant has recently been increased.